

THE PAN-PACIFIC ENTOMOLOGIST

E&A

COMMONWEALTH INST.
ENTOMOLOGY LIBRARY
12 SEP 1953
SERIAL U.S.A. 126
SEPARATE



CONTENTS

GILLOGLY & GILLOGLY— <i>Trichogramma minutum</i> in monarch butterfly eggs	111
GRESSITT—Supplement to "The Hispine Beetles of China"	121
ESSIG—A remarkable new aphid from Israel	127
PRITCHARD—The white clover flower midge as differentiated from the red clover flower midge	128
MIDDLEKAUFF—A new species of web-spinning sawfly feeding upon pines	133
MALKIN & HATCH— <i>Colpodes buchanini</i> in Oregon	134
STARK—An unusual occurrence of three spermathecae in a specimen of <i>Hystriochopsylla dippei</i>	135
LA RIVERS—A new species and subspecies of <i>Ambrysus</i> from Guatemala	138
RYCKMAN— <i>Triatoma rubida sonoriana</i> infected with <i>Trypanosoma cruzi</i> in Sonora, Mexico	143
RYCKMAN—Notes on the ecology of <i>Bombus sonorus</i> in Orange County, California and new parasite records	144
HOTTES—Aphidological gleanings	147
RYCKMAN— <i>Cuterebra latifrons</i> reared from <i>Neotoma fuscipes</i> macrotis	155
WILLIAMS—Additions and corrections to "The Wasps of the Genus <i>Solierella</i> in California"	157
RYCKMAN & AMES—Insects reared from cacti in Arizona	163
DENNING—A new genus of <i>Limnephilidae</i>	165
FENDER—New species of <i>Podabrus</i> from western North America	170
HELPER—A new subspecies of <i>Trachykele blondeli</i>	176
USINGER—Notes on the genus <i>Metrobates</i> in California with a description of a new subspecies	178
Book Notices	126, 137, 179, 180

SAN FRANCISCO, CALIFORNIA • 1953

Published by the PACIFIC COAST ENTOMOLOGICAL SOCIETY
in cooperation with THE CALIFORNIA ACADEMY OF SCIENCES

THE PAN-PACIFIC ENTOMOLOGIST

EDITORIAL BOARD

E. G. LINSLEY

P. D. HURD, JR., H. B. LEECH

R. L. USINGER

E. S. ROSS

Co-Editors

R. C. MILLER, *Treasurer*

A. E. MICHELbacher, *Advertising*

Published quarterly in January, April, July, and October with Society Proceedings appearing in the January number. Papers on the systematic and biological phases of entomology are favored, including articles up to ten printed pages on insect taxonomy, morphology, life history, and distribution.

Manuscripts for publication, proof, and all editorial matters should be addressed to H. B. Leech at the California Academy of Sciences, Golden Gate Park, San Francisco 18, Calif., or to P. D. Hurd, Jr., at 112 Agricultural Hall, University of California, Berkeley 4, Calif. All communications regarding non-receipt of numbers, changes of address, requests for sample copies, and all financial communications should be addressed to the treasurer, Dr. R. C. Miller, at the California Academy of Sciences, San Francisco 18, Calif.

Domestic and foreign subscriptions, \$4.00 per year in advance. Price for single copies, \$1.00. Make checks payable to "Pan-Pacific Entomologist."

Memoirs Series . . .

"THE SUCKING LICE"

By G. F. Ferris

A 300 page book which summarizes knowledge on the Anoplura of the world. Chapters cover such subjects as History, Growth and Development, Morphology, Host Relations, Classification, Biogeography. Complete systematic treatment is given including keys, synonymy and descriptions. The illustrations are in the well-known style that has earned the author his reputation as "one of the very foremost of entomological artists." The 125 full pages of figures include morphological details, and full illustrations of the type species of each genus and of all of the species which are associated with man and domesticated animals.

Published as the first volume of its new "Memoirs Series" by the Pacific Coast Entomological Society on the occasion of its Semicentennial Anniversary, September, 1951.

Price \$6.00

Send orders to: Treasurer, Pacific Coast Entomological Society, California Academy of Sciences, San Francisco.

Entered as second class matter, February 10, 1925, at the post office at San Francisco, under act of August 24, 1912.

TRICHOGRAMMA MINUTUM IN MONARCH BUTTERFLY EGGS

(Hymenoptera: Trichogrammatidae; Lepidoptera: Danaidae)

G. M. AND L. R. GILLOGLY

Sacramento, California

It was purely by accident that some minute egg parasites were found while monarch butterflies were being reared as the family's summer-time hobby. The boys had brought in a spray of milkweed with two eggs on it. The eggs did not hatch, but darkened instead. Days later, when about to throw away the milkweed, we saw a little black thing sticking out from one egg. We put the egg in a bottle and watched. There emerged an insect of incredibly small proportions. Under the magnifying glass it appeared to be a wasp.

This interloper was frowned upon because our original purpose was to see that more of the handsome monarchs survived. As many eggs as possible were then collected in an attempt to minimize the number that might become parasitized. The wasps emerged in vials and they were not released in the field. Not until the end of

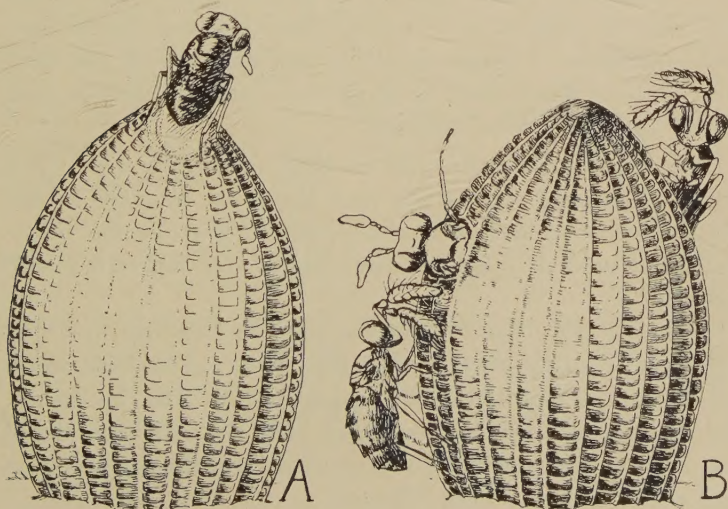


Fig. A. *Trichogramma* wasp laying her eggs in a monarch butterfly egg.
Fig. B. *Trichogramma* emerging from the monarch egg about 12 days later.

the 1950 season did we have time through reading to discover that these egg parasites are a useful check against many injurious Lepidoptera, and that the efforts to control them in favor of the monarch were amateurish and probably with little effect anyway.

Curiosity and fascination with the miniature wasps soon made butterfly rearing the side line. The egg parasites were not reared with mass production methods, but in one hundred small vials.

Although *Danaus menippe* Hübner is not of economic importance, the study of its enemies may apply indirectly to the biological control of some insect pests. The records which follow represent a study of the degree of parasitization under field conditions. The eggs had met their fate in the field and were brought into the house to determine the extent of the parasitization. They contained therefore not successive generations but reflected field populations and activity of the parasites.

The collections of monarch eggs were made from a vacant lot behind our home in Sacramento, California. The milkweed *Asclepias mexicana* Cav. started to come up in May. There were over 50 plants, averaging about ten inches high by the middle of summer. No plant grew above two feet high. Monarch eggs were most often laid at the base of the flower buds. The underside of the narrow leaves frequently yielded eggs also. In fact the stems, flower petals and even the pods were considered likely locations by the egg-laying monarchs. A single egg at one spot was the rule, but there were about a dozen cases in which two were laid next to each other; once three were touching.

The eggs were usually collected three times each week. They were not gathered at a regular hour but in the morning on one day, at noon on another, and in late afternoon on yet another day—as the various kinds of lighting made evident some that were missed previously.

The first egg of the 1951 season was found on May 31st. The first week of August marked an upsurge in the egg business, which remained on a high level until September 15th. The last eggs of the season were found on November 16th. An individual record was kept for each egg and it was noted whether the egg was fresh and white, or black, when collected.

The conclusions from two summers of parasite rearing are included in this report.

As many more monarchs were flying in our yard in 1951 than in the previous year, the monarch season for 1951 will be used to give an idea of the extent of parasitization of the eggs. A total of 1043 eggs were collected; of these 360 were parasitized by *Trichogramma*, 260 eggs hatched, 56 had been sucked dry by predators, over 200 eggs contained only dried yellow embryos, and about 150 were found to have died when the little caterpillar was fairly well developed, with black head-capsule and spines.

The last week in August and the first two weeks of September were the peak of the season for both monarch eggs and the parasites. The duration of the *Trichogramma* season in monarch eggs was from July 9th until November 27th.

It is believed that the *Trichogramma* observed here do not hibernate in monarch eggs. However, there was one case that was very close to hibernation. An egg collected on November 16th turned black on the 19th, but parasites did not emerge on the 27th as did those in two other eggs collected at the same time. In the middle of February 1952 the unpromising egg was dissected and found to contain four plump pupae which had apparently only recently died, as they were just beginning to shrink. They were not crisp as in the cases when the immature wasps had been dead for three months.

Nevertheless it appears that this species of *Trichogramma* may overwinter in other lepidopterous eggs, because in January, February, and March of 1952 wasps emerged from eggs collected in October of the previous year. The cabbage butterfly, sweet anise swallowtail, west coast lady, and skipper eggs carried a few *Trichogramma* over the winter.

Most of the monarch eggs were white or cream-colored when they were collected. If they later turned gray and then black, parasitization was suspected. The length of the pupal stage was calculated by noting the time that elapsed between the date the egg turned black and the date the parasites emerged. The average length of the pupal stage of *Trichogramma* in monarch eggs in Sacramento for the summer of 1951 was as follows:

July	7 days	September	
August		1-15	8 days
1-15	6½ days	16-30	9 days
16-31	8 days	October	10 days

Even creatures as small as one half a millimeter have their troubles too. Because of drying, mold, and possibly disease, quite a number of *Trichogramma* did not successfully reach the adult stage. One out of four parasitized eggs contained a few egg parasites which never emerged. These 85 eggs yielded a total of 277 individual wasps, which were dissected out in February after the season was over. In all but one case these wasps were dried. Of larvae which were distinguishable at 25 power magnification there were 44, of pupae 177, and of adults which could not manage to get out, 56.

Of the eggs which contained dead parasites there were only 28 from which no wasps at all emerged, but there were 57 eggs which had some wasps remaining inside after the adults had emerged. The average number of wasps left in each of the other 57 eggs was two.

Some monarch eggs were not found before their parasites had already emerged in the field. There were 41 of these eggs which had an exit hole when they were collected. Ten were later found to have one to four dead pupae remaining inside.

The first two weeks of September claimed the highest mortality of non-emerged wasps. October collections showed a greater number of dead immature wasps than did either July or August.

The adult wasps which emerged from monarch butterfly eggs varied in color, size, number, and the proportion of the sexes. The most striking way in which the wasps differed was in the range of color from clear light yellow to jet black. The first case of monarch egg parasites observed in the 1951 season was unique in that there were ten wasps of a uniform light golden color, except for the red eyes. Two weeks later six dark brown wasps, with yellow legs and the usual red eyes, emerged. The third egg to produce parasites, in which all had a golden thorax, brown abdomen, and light yellow legs, was typical of the majority of parasitized eggs during the season. On August 14th an egg produced black wasps. Then black wasps emerged from only a couple of eggs each week until the last week in September when the number suddenly jumped to 20 and outnumbered the golden type, which emerged from seven eggs. For the remainder of the season the black form predominated. Almost exactly twice as many were reared of the golden thorax type as of the black type, taking the year as a whole.

There were two intermediate color phases which emerged from

17 eggs: wasps with a tan thorax and brown abdomen and wasps of a uniform brown color. These were scattered through the season, with no concentration at any particular time. It should be noted that on four occasions during the summer an egg had parasites of mixed color types: September 13—two golden, one black; September 16—one golden, four black; September 18—three golden, three dark brown; October 16—one golden, six black.

In size our *Trichogramma* varied from minute, 0.29 mm. in length, to whopping big, 0.75 mm. It is reported by Clausen (1940) that "in relative volume the smallest males were only one twenty-fifth the size of the largest, and the smallest females one-fortieth the size of the largest female." The wasps which emerged from many of the monarch eggs were equal in size; but in almost the same number of cases there was great variation. It was not unusual to see one wasp huge and burly, looking like a buffalo among sheep. Microapterism, in which some males are tiny and have only vestigial wings, was almost nonexistent. On August 14th the only occurrence was observed. One wasp of six was an extremely small male and had no wings, even a number of hours after the females had their wings groomed and of the proper length.

A subject of constant interest throughout the season was how many would come out of the egg. The monarch eggs produced from one to 15 egg parasites each. Four to nine was the usual number. Both the overall average and the median number was six. Time and again came the familiar combination: one male and five females. The next most frequent combination was one male to six females, and third in favor was one male and four females. More than half of the eggs produced only one male each. The males were definitely in the minority. Now and then, however, an egg would contain only males and in this way their total was augmented. The largest number of wasps to emerge from a single egg was 15, all males. At final count the females led by nearly three to one.

The arrhenotokous and thelytokous races discussed by Marchal (1936) aroused our curiosity as to whether these *Trichogramma* also displayed such tendencies. There were 12 certain cases in which all males came from a given egg. Seven additional eggs had all males emerging, but there remained immature dried pupae inside of the egg, so these should probably not be included. It was interesting to speculate if the 12 cases did indeed constitute

parthenogenetic offspring. There were 14 definite instances in which only females emerged from eggs.

Although some details of the home life of the wasps could be seen with the unaided eye, *Trichogramma* behavior was brought into better focus with 25 or 50 power magnification.

Soon after climbing from its pupal skin the adult wasp set to work cutting a hole in the egg shell in order to emerge from the dark confines of the monarch egg. Flanders (1930) observed that "the parasite just before its emergence from the egg is positively phototropic since it cuts an exit hole on the side exposed to the strongest light." It sometimes took as long as an hour for the wasp to carve out with its mandibles a hole large enough to accommodate its body. Occasionally a wasp would miscalculate with the result that the abdomen could not go through. If not stuck, the wasp would back down and excavate through another tough rib of the egg. The usual pin-hole size of exit required one rib to be cut through, and its neighboring valley on each side. However, one large female had to make a hole by chewing through three ribs and three valleys. For an hour she was to be seen down in the hole, with antennae bobbing, a red eye staring out now and then, and all the while actively enlarging the nearly circular aperture.

Upon occasion a waiting wasp would become impatient with the progress being made by another on the exit hole and would start a hole of his own. In one monarch egg which had obviously been peopled with independent thinkers there were three separate exit holes. As a rule, however, all the wasps from one egg were content to emerge through one hole.

After the first wasp came out, the other wasps in the egg nearly always emerged within an hour. Once in a while there was a delay of several hours between each exit, causing one to wonder if they were drawing straws or trying to screw up courage to face the world.

When the first wasps out from the egg were females, or only females emerged, they walked off the egg apparently oblivious to one another. They stood an inch or two away and groomed their antennae and straightened their wings. The delicately patterned wings did not appear to lengthen as do the wings of moths and butterflies. The wings of *Trichogramma* were straightened out manually and the process took from 15 to 45 minutes.

The wing spreading reminded one of rolling out tortillas to get them thin and smooth on the edges. The body was supported by the first two pairs of legs while the back feet stroked down the wings. The wasp stroked both the ventral and dorsal surfaces of the abdomen, which became less globular. Then the wing was stroked again. The tarsi of one hind leg held firmly in the roll of the wing and the other foot repeatedly pulled down with all its might on the edge of the wing. Some wasps would manage to spread a wing half way down, then would commence on the other little wing pad. There was apparently no harm done if the wing-grooming was not attended to immediately. The completed wing was a thing of beauty. The iridescent colors ranged from pink on the outer portions of the anterior wings, to peacock blue in the central area, to golden near the wing vein, and bright silver near the thorax.

When a male is the first to emerge from the egg, a different type of behavior occurs. Take for an example a case on October 18th. At 8:30 a.m. two wasps are out, both are males, both remain on the egg. One has his antennae in the exit hole. The other walks over the egg, tapping all over with his bushy antennae, then returns to the hole. He looks in at the operations going on—the hole is being enlarged by a wasp inside. Out comes a head, but down it goes again for the size does not yet satisfy the artisan. Both males alertly watch the hole. An antenna appears from below; a wasp outside puts his foot gently on the antenna which is stuck up in the air, while the wasp inside goes to work cutting some more bits from the egg shell. One male is standing very close to the hole now; he excitedly taps his foot on the egg, rubs antennae and seems to converse with the fellow in the manhole. He steps closer, his front feet straddling the hole. Out comes a wasp head—with female antennae. The male backs up a little. The emerging wasp is having trouble getting through the hole, she is waving her legs helplessly. The male helps to lift her out, tugging vigorously first from the back and then from the front while practically standing on his two hind feet. The other male rushes up and both pull. How kind, how considerate. But stay. The instant she is free of the egg the males immediately copulate with her in turn. The female hurries off the egg to a less congested spot and begins to unfurl her wings.

The males scout the egg again, returning constantly to the exit hole. There appears to be no animosity between them as they

touch antennae over the hole—there is no fighting, no shoving. Soon a fourth wasp is out, aided by the gallants at the door. It is once more a female. And they initiate her into the ways of the world. One of the male wasps retires to groom his wings, the other resumes his tireless watching of the hole in the egg, only his agitated antennae-tapping betraying his anxiety. The vigilance is rewarded by yet another emergeé. Forty minutes have now elapsed since the male came out, yet he keeps up his watchman's duty and the floor-pacing even after all the wasps have emerged. Our two small boys laugh themselves into hiccups at the antics of the little watchman guarding the hole. Ten minutes later finds him on the leaf belatedly pulling at his wing pads.

The above incident was not unique. Helping another wasp was the common thing. On at least one occasion a male struggled for over an hour to extricate a wasp stuck in a hole that was too small. The female wasps did not often stay on the egg. No case was observed in which a female helped another wasp from the egg. When a male was about to emerge from an egg, the others who had come out ahead of him were off attending to the cleaning of their antennae or the straightening of their wings.

On a few occasions wasps were captured on the milkweed plants before they had the wings suitable for flying. However, the wasps were not entirely at the mercy of their enemies as they could walk, run, and jump actively as soon as they came from the host egg. In confinement the *Trichogramma* were fairly passive for the first half hour after their emergence as they were intent on spreading their wings. If they were disturbed they would dash about. If the vial was turned so that the egg rolled over, the male on the egg was not dislodged. Only violent jiggling of the vial caused him to lose the egg, then he would roam around until he found the leaf and would resume his place on the egg.

Once in a while a female emerged from the egg when no other wasp was in sight. On a particular occasion as the female walked from the egg her path crossed that of a very tiny male who just happened to be going by at an opportune moment. There was immediate pairing. More often the male would see a female coming his way. He would approach slowly on wobbly, rubbery legs. With a rolling gait he would saunter completely past her, and then in a

flash they were paired. The male did not always have the swaying gait; he could walk all right when he chose. The wasps showed remarkable smoothness in their walking and running, appearing to roll on wheels. There were few jerky movements. As they ran in the vial they would meet one another and touch antennae briefly. Pairing was still in evidence after the wasps had been out eleven days. The wasps made long-distance flights in the three-inch vial.

In captivity the life span of the monarch parasite appeared to be a maximum of 46 days from *Trichogramma* egg, through larval, pupal, and adult stage. In that case in late October six days were accorded to the larval stage, eleven to the pupal stage, and 29 days to the adult stage. Only two wasps lived as long as 29 days, one lived for 28 days, and several were active up to 26 days. The more usual condition may be a life span of about a month with the wasp spending three days as a larva, eight days as a pupa, and 18 days as an adult. These figures, however, represent rearings and may not truly represent the life span of monarch's *Trichogramma* in the field. May we add that we are not contemplating fitting the wasps with identifying leg bands in order to find out!

In summary, it was found that in Sacramento, California, *Trichogramma minutum* served as a natural check to the increase of the monarch, *Danaus menippe* Hübner. During the summer and autumn of 1951 one out of three butterfly eggs was parasitized, exclusively by *Trichogramma*. More eggs produced parasites than yielded live caterpillars. Adding the 1338 live wasps which emerged in captivity to the number which must have emerged in the field before some of the eggs were found, gives a potential 1900 *Trichogramma* which would have been released in the quarter-acre field during the monarch season. In September an estimated 100% parasitization might have occurred had no eggs been collected and thereby protected.

The monarch eggs were collected from May 31st until November 16th, while the parasites emerged from July 9th until November 27th. The greatest numbers of parasites occurred in the last week of August and the first two weeks of September. The only evidence of hibernation was when an egg contained pupae which lived over December and January, dying in February before maturity was reached. The immature wasps developed inside the egg host most rapidly in the first half of August. There were some dead wasps

in one out of four parasitized eggs. As a seasonal average, one wasp out of every six failed to successfully reach the adult stage. The pupal stage was apparently most susceptible to mortality.

The adult wasps which did emerge varied in color from light yellow to shining black, varied in size from 0.29 mm. to 0.75 mm., varied in number from one to 15 from one monarch egg, and varied also in the combination of sexes. Males were in the minority, outnumbered three to one. Three per cent of the eggs yielded all male wasps, nearly an equal number yielded only females.

The average number of wasps from one egg was six. The most frequent combination was one male and five females. Immediately after the wasps emerged from the egg mating took place. Then the wings were unfurled. The wasps in captivity lived two days without food, and a maximum of 29 days when they had been fed diluted honey. The complete life span from egg until the end of adult life may average less than a month.

For the season as a whole the wasps with a golden thorax and brown abdomen were twice as numerous as the black wasps which predominated during the autumn months. Some fruitless attempts were made to cross the golden wasps with the black forms, but more experiments will need to be conducted before conclusions can be drawn.

Sincere thanks are due to Dr. R. L. Doutt of the University of California who determined the egg parasites as *Trichogramma minutum* Riley.

REFERENCES CITED

CLAUSEN, C. P.

1940. Entomophagus Insects. McGraw-Hill Book Co., New York. pp. 106-117.

FLANDERS, S. E.

1930. Notes on *Trichogramma minutum*. Pan-Pacific Entomologist, vol. 6, no. 4:180-181.

MARCHAL, P.

1936. Les *Trichogrammes*. Annales des Épiphyties et de Phytogénétique. Imprimerie Nationale, Paris, vol. 2, pt. 4. 104 pp.

SUPPLEMENT TO "THE HISPINE BEETLES OF CHINA"

(Coleoptera: Chrysomelidae)

J. LINSLEY GRESSITT*

The following records and descriptions are based on specimens which were not at hand when the manuscript of "The Hispine Beetles of China"¹ was submitted for publication. The page references following the names refer to the above work. Types indicated as in the Lingnan Natural History Museum are at present on loan deposit in the California Academy of Sciences.

Tribe CALLISPINI

Callispa angusta Gressitt, (p. 67).

One (Calif. Acad. Sci.), Ta-chu-lan, Shaowu, NW. Fukien Prov., SE. China, May 12, 1942, T. Maa.

Callispa donckieri Pic, (p. 70).

Two (Lingnan & C. A. S.), Ta-chu-lan, Shaowu, Fukien, April 15 and August 12, 1943, T. Maa.

Callispa ruficollis Fairmaire, (p. 72).

One (Mus. Comp. Zool.), Ching-chen Shan, Szechuan Prov., W. China, July 1932, G. Liu.

Leptispa godwini Baly, (p. 75).

One (Lingnan), Ta-chu-lan, Shaowu, Fukien Prov., May 16, 1945, T. Maa.

Tribe GONOPHORINI

Neodownesia Gressitt, new genus

Elongate-fusiform; head short, distinctly narrower than prothorax; mouth-parts situated close to antennal insertions; occiput swollen. *Antennae* short; basal segments thickened distally; apical segments cylindrical; second to tenth segments not very different in length; scape slightly larger; last longer.

* Bernice P. Bishop Museum, Honolulu, Hawaii.

¹ Lingnan Science Journal, 23 (1-2):53-142, 5 plates. December, 1950.

Generotype: *Neodownesia rubra* new species

Differs from *Downesia* in having the mouthparts situated close to antennal insertions, instead of being separated from them by a distinct frontal area, and in having the pronotum deeply sculptured instead of smooth, and the elytra broadened in middle and gradually narrowed posteriorly, instead of sub-parallel.

***Neodownesia rubra* Gressitt, new species**

(Figure 1)

Dorsum bright red, pitchy black along suture from just behind scutellum to top of posterior declivity; head pale red on swollen portions of occiput, duller red to pitchy on remainder; antenna black; ventral surfaces of body pitchy to castaneous, darkest on thoracic pleura and palest on median portions of thoracic sterna, except for hind portion of metasternum; legs pitchy castaneous, nearly black on tarsi and basal portions of femora.

Head much narrower than prothorax, more or less rounded; mouthparts separated from antennal insertions by an arcuate ridge; vertex concave; occiput with a medially grooved strong transverse swelling between upper eye-lobes and followed by a sub-transverse depression; swellings and postocciput finely punctured. *Antenna* reaching beyond humerus, moderately stout; scape a little larger than second segment; third barely longer than second; fourth barely as long as second; fifth equal to fourth; sixth to tenth each about as long as fifth, but slightly stouter; last longest, tapering and somewhat blunt. *Prothorax* a little broader than long, dorsal outline convex anteriorly and very slightly concave at each side; disc sloping at sides, grossly punctured, in part very closely so, but with 3 irregular longitudinal impunctate strips on central area, a longitudinal impression on middle of each side, and a small deeply punctured depression opposite scutellum. Scutellum small, slightly longer than broad, narrowed and rounded apically. *Elytra* long, 3 times as long as head and prothorax combined, slightly broader than prothorax basally, gradually broadened to behind middle, then gradually narrowed, and separately broadly rounded apically; somewhat evenly convex in transverse outline; each with 3 fairly distinct costae, second and third uniting some distance from apex, 2 rows of deep punctures each between suture and first costa, between first and second, and between second and third; between third costa and external margin there are 3 rows anteriorly and 4 posteriorly. Ventral surfaces rather smooth and glossy; *abdomen* finely and sparsely punctured; metepisternum, and side of metasternum each with a row of close punctures. Length 6.5 mm.; breadth 1.85.

Holotype (Lingnan Nat. Hist. Mus.), TA-CHU-LAN, alt. 1,000 met., SHAO-WU, NW. FUKIEN PROV., SE. CHINA, June 10, 1942, T. Maa (Maa Tsing-chao); *paratopotypes* (Lingnan, C. A. S., and Uhmman Collection), May 3, 1942.

Much rougher, and less flattened above, and more fusiform, than species of the genus *Downesia*.



1



2



3

Fig. 1—*Neodownesia rubra* Gressitt, n. gen., n. sp. Fig. 2—*Agonita sculpturata* Gressitt, n. sp. Fig. 3—*Agonita picea* Gressitt, n. sp.

Agonita picea Gressitt, new species

(Figure 3)

Pale pitchy red-brown above; largely pitchy brown to pitchy black beneath; antennae and legs black; head blackish above and reddish in front; scutellum pitchy.

Head almost as broad as prothorax, with eyes slightly prominent; occiput finely and sparsely punctured, with a short elliptical depression at middle; vertex very slightly produced between antennal insertions; frons somewhat arcuate, about 3 times as broad as long. *Antenna* barely over one-half as long as body; distal segments more cylindrical, but hardly thicker, than postbasal segments; scape thickest, flattened-cylindrical; second to sixth segments subequal; second a little thicker, and a little shorter, than third segment; seventh to tenth each longer than sixth; last longest. *Prothorax* slightly broader than long, somewhat margined at sides, widened at middle of each side, slightly constricted near apex and base; disc convex, smooth in center, irregularly, and in part heavily, punctured on remainder, deeply depressed just behind middle of each side, and less deeply, and obliquely, so on each side of middle near base. Scutellum narrowed posteriorly, parallel-sided and subtruncate apically. Elytra nearly 3 times as long as head and prothorax combined, broadest just before apices; each with 3 complete costae, the third feeble except near apex, 2 rows of punctures between suture and first costa, 3 rows between first and second costae, except basally where there are 4 irregular rows, 2 rows anteriorly and 3 rows posteriorly between second and third costae, and 3 rows anteriorly, 2 at middle, and 3 posteriorly, between third costa and external margin; external margin flattened, minutely toothed posteriorly. Ventral surfaces sparsely, but distinctly, punctured. Length, 5.4 mm.; breadth, 1.8.

Holotype (Lingnan Nat. Hist. Mus.), TA-CHU-LAN, SHAOWU, NW. FUKIEN PROV., SE. CHINA, June 6-9, 1943, T. Maa; *paratype* (Calif. Acad. Sci.), same data.

Differs from *A. laticeps* Gressitt in having 3 rows of punctures between first and second costae of each elytron, and 3 rows of punctures between second and third costae. The generic name *Agonia* was preoccupied, and has been renamed *Agonita* by Strand.

Agonita sculpturata Gressitt, new species

(Figure 2)

Ochraceous brown, in part pitchy. *Head* pale on labrum, frons and occiput, pitchy behind eyes; antennae black, pitchy basally; prothorax pale ochraceous, pitchy across middle of disc, somewhat reddish at sides of disc and pitchy black on lower sides; scutellum pitchy. *Elytra* orange ochraceous, paler on external margin and darker along suture; ventral surfaces yellowish testaceous on thoracic sterna, first abdominal sternite and parts of legs, reddish-ochraceous on last four abdominal sternites, pitchy on thoracic pleura, tarsi, fore tibia, outer edges of fore and middle femora, and apices of middle and hind tibiae.

Head narrower than prothorax; eyes moderately prominent; frons convex, twice as broad as long; vertex with a short compressed projection be-

tween antennal insertions; occiput smooth, nearly impunctate. *Antenna* about one-half as long as body, moderately stout, gradually thickened in basal half; scape swollen cylindrical; second segment barely smaller than scape, slightly swollen; third as long as second, more cylindrical and more slender; fourth a little longer than third; fifth longer than fourth; sixth to tenth each shorter and slightly stouter than fifth, subcylindrical, not much longer than broad; last longest, acute apically. *Prothorax* broader than long, distinctly margined laterally, gradually widened from near base to beyond middle, then rounded and constricted near apex; disc moderately convex on central portion, declivitous posteriorly, grooved medially, with 3 partial rows of large punctures on each side, then a strong longitudinal ridge separated by 2 or 3 rows of deep punctures from lateral margin; apical constriction with a transverse row of deep punctures; basal depression with some deep punctures. Scutellum narrow, subtruncate apically. Elytra much wider than prothorax, widened behind humeri, then almost parallel-sided to near apices; disc of each with three costae, the first two sharp, the third obsolete except at base and apex, with two puncture-rows between suture and first costa, two between first and second costae, but with 3 or 4 rows basally, and 2 rows each between second and third costae, and between third and external margin. Ventral surfaces in part finely and not very closely punctured, swollen and impunctate on most of metasternum and first abdominal sternite. Length 5 mm.; breadth 2.

Holotype (Lingnan Nat. Hist. Mus.) TA-CHU-LAN, alt. 1,000 met., SHAOWU, NW. FUKIEN PROV., SE. CHINA, June 6, 1943, T. Maa; *paratopotypes* (Lingnan, C. A. S., Uhmann Collection) May-June, 1943, Maa.

Paratypes: Pronotum sometimes largely pale, and suture very slightly darkened. Length 4.5–5.5 mm.; breadth 1.8–2.1.

Differs from *A. laticeps* Gressitt in having the prothorax shorter, not nearly as long as broad, grooved medially and with a strong longitudinal ridge near each side of disc, and with the elytra pale instead of black and nearly truncate apically.

Tribe HISPINI

Hispellinus moestus (Baly), (p. 98).

One (Lingnan) Wingan, Fukien Prov., Aug. 31, 1940, T. Maa.

Dactylispa approximata Gressitt, (p. 111).

Some (Lingnan and C. A. S.) Ta-chu-lan, Shaowu, Fukien, May and October, 1943, T. Maa.

Dactylispa chinensis Weise, (p. 115).

Some (Lingnan and C. A. S.) Suisapa, Lichuan, Hupeh Prov., July 1948, Djou and Gressitt; Shaowu, Fukien, April 1943, T. Maa.

Dactylispa crassiuspis Gestro, (p. 116).

Some (Lingnan and C. A. S.) Suisapa, Lichuan, Hupeh, July 1948, Djou and Gressitt.

Dactylispa excisa repanda Weise, (p. 117).

Some (Lingnan and C. A. S.) Suisapa, Lichuan, Hupeh, July 1948, Djou and Gressitt.

Dactylispa platyacantha Gestro, (p. 126).

Some (C. A. S. and Lingnan) Shaowu, Fukien, April 30, 1942, T. Maa.

Dactylispa sinuispina Gressitt, (p. 129).

Some (C. A. S. and Lingnan) Shaowu, Fukien, May 1945, T. Maa.

Dicladispa armigera similis (Uhmann), (p. 134).

Some (C. A. S. and Lingnan) Chungan, Fukien, at alt. of 1,500 meters, August 23, 1940, T. Maa.

Platypria fenestrata Pic, (p. 137).

Some (C. A. S. and Lingnan) Shaowu, Fukien, April 1942, T. Maa.

CASSIDISPA BIPUNCTICOLLIS Chen

Cassidispa bipuncticollis Chen, 1941, Sinensia 12: 196¹ (type in Mus. Hoang-ho Pei-ho).

This species was unfortunately omitted from "The Hispine Beetles of China."

China: Shensi (Kiao-cheu¹).

Distribution: N. China.

CORRECTIONS TO "The Hispine Beetles of China."

(Lingnan Sci. Jour. 23 (1-2):53-142, plates 4-8, 1950). Page 62, just below middle:

Key to Chinese genera of Anisoderini [not *Lasiochilini*]

Page 83, end of key, below middle:

. **strand**i [not *rufodorsata*].

AMERICAN MEGALODACNE (Erotylidae). In K. Delkeskamp's paper "Die Erotyliden-Ausbeute des Herrn Dr. A. de Barros Machado aus Angola, Revision von 2 Untergattungen und Verzeichnis der Erotyliden-Arten von Angola" (1952. Pp. 55-89, figs. 1-14, in Publicações Culturais No. 14, Museo do Dundo [Lisbon], there is a key to the African and American subgenera of *Megalodacne* Crotch (p. 65), an illustrated treatment of the American species of the subgenus *Psephodacne* Heller (pp. 67-71, 73-76), and a key to and check list of the American species and subspecies of *Megalodacne* (pp. 71-73). One new subspecies is named.—H.B.L.

A REMARKABLE NEW APHID FROM ISRAEL

(Homoptera)

E. O. ESSIG

University of California, Berkeley

On June 28, 1951, Dr. Jos. Carmin of the Independent Biological Laboratories, Kafar-Madal, Ramatayim, Israel, sent me for determination a large series of alcoholic specimens of aphids collected in Israel. Among them was a single dried specimen, #N 3216, which differs from any species I have seen. Although the name of the host plant was never ascertained the aphid is so unusual that it will be possible to readily identify it if encountered again. I am therefore placing it in a new genus and a new species.

***Israelaphis* Essig, new genus**

Body slender, bearing 10 long fleshy imbricated tubercles; 4 on each of segments VII and VIII and 2 larger ones on IX. Eyes compound with ocular tubercles. Antennae long and slender with small circular secondary sensoria.

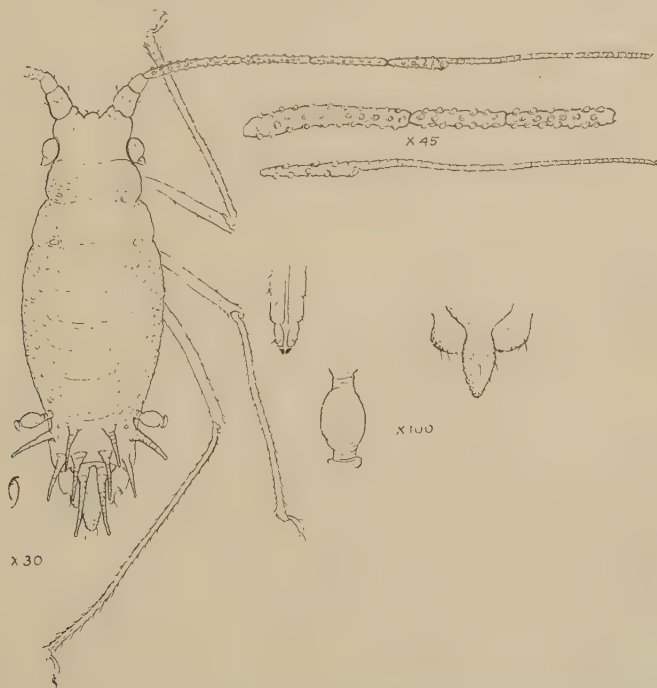


Fig. 1. *Israelaphis carmini* Essig, n. sp. Apterous female and important characters including enlargement of the antenna, tip of the rostrum, a cornicle, and cauda and anal plate. (Drawing by Frieda Abernathy.)

Rostrum short. Cornicles greatly enlarged in the middle and constricted basally and anteriorly. Anal plate shallowly bi-lobed. Cauda elongate, constricted near base.

Type species: *Israelaphis carmini* new species

Israelaphis carmini Essig, n. sp.

(Figure 1)

Body slender; cleared specimen shows no pigmentation; surface rough as in *Cavariella*; spiracles prominent. Length 1.93 mm. Antennae slender, longer than body or 2.6 mm.; unguis 3 times the base; with many small circular secondary sensoria distributed over segments III-V and the base of VI. Rostrum extending just beyond 2nd coxae, apical segment very small. Legs normal with many short hairs. Cornicles greatly enlarged in middle and constricted basally and apically (on the slide one cornicle is not so inflated as the other; the difference may have been caused in mounting). The posterior, dorsal fleshy, pointed and imbricated tubercles are as illustrated (some improvising was necessary in making the drawing); those on each of segments VII and VIII are 4 in number, while there are 2 larger ones on segment IX which extend backwards beyond the cauda. Anal plate bilobed, cauda elongated with wide base and constriction basad of the middle; both with few hairs.

Holotype. The single apterous individual mounted on a slide has been designated as the type; it is from WADI MUSSARA, PETAH TIKVALI, ISRAEL, March 9, 1931. The specimen was collected by sweeping various plants with a collecting net.

This unique species has been named for the donor, Dr. Jos. Carmin. The type is in the author's collection.

THE WHITE CLOVER FLOWER MIDGE AS DIFFERENTIATED FROM THE RED CLOVER FLOWER MIDGE

(Diptera: Itonididae)

A. EARL PRITCHARD

University of California, Berkeley

There are many areas in both Europe and North America where numbers of pink maggots are found commonly in the flowers of red clover. The larvae feed on the ovules, and they are responsible for a substantial loss in the production of red clover seed.

Midge larvae are also known to feed on the ovaries of white clover, and they have been regarded as representing the same species that attacks red clover.

However, Margot Metcalfe (1933) found that the red clover flower midge bred in all of the varieties of red clover in her experimental plots in England, but none of the interspersed plots of white varieties served as hosts. Moreover, L. G. Gentner (personal

communication), working with a Ladino clover flower midge in Oregon, observed that none of the volunteer red clover plants were attacked in the presence of infested Ladino clover.

Because of these discrepancies, a taxonomic study of the clover flower midges was undertaken. Adults of midges reared from red clover were found to be morphologically distinct from adults reared from Ladino clover, and they are here regarded as representing two different species.

Specimens in the E. P. Felt collection that were reared from red and white clover were examined by courtesy of D. L. Collins of the New York State Museum. Alan Stone and E. A. Chapin kindly loaned for study all of the clover midge material in the U. S. National Museum.

L. G. Gentner submitted the specimens that were reared by G. W. Bishop from clover in Oregon, E. C. Klostermeyer furnished specimens from clover in the State of Washington, and H. F. Barnes supplied midges reared from clover in England.

DASINEURA LEGUMINICOLA (Lintner)¹

Red Clover Flower Midge

Cecidomyia trifolii Lintner, 1879 (not Loew, 1874), Canad. Ent., 11:44. Described from larvae taken from flowers of red clover in New York. Primary homonym.

Cecidomyia leguminicola Lintner, 1879, Canad. Ent., 11:121. New name for *C. trifolii* Lintner (not Loew).

Dasyneura leguminicola, Aldrich, 1905, Smithsonian Misc. Coll., 46:155; Felt, 1911, Jour. Econ. Ent., 4:473; Felt, 1915, Bull. N. Y. State Mus., 589:172; Metcalfe, 1933, Ann. Appl. Biol., 20:187.

Dasyneura ?leguminicola, 1933, Felt, 1908, Bull. N. Y. State Mus., 124:349, 350.

Cecidomyia flosculorum Kieffer, 1890, Verh. zool.-bot. Ges. Wien, 40:200. Described from specimens reared from florets of *Trifolium medium*, in Germany. **New synonymy.**

Perrisia flosculorum, Kieffer, 1913, Gen. Insect., 152:76.

Dasyneura flosculorum, Metcalfe, 1933, Ann. Appl. Biol., 20:186; Barnes, 1946, Gall Midges Econ. Imp., 2:35.

The most distinctive characteristic of *Dasineura leguminicola* is the morphological structure of the male genitalia. The proximal roots of the basiforceps end separately in a broad, well developed but lightly sclerotized apodeme of the phallic structures. The tenth

¹ Rondani consistently used the spelling *Dasineura*, and the original spelling is retained in this article. Most subsequent workers have accepted the emendation *Dasyneura*. However, the action of the International Commission of Zoological Nomenclature in the case of *Flebotomus* Rondani vs. the emendation *Phlebotomus* suggests that emendations of this type should be submitted to the Commission for approval. The entire question of emendations is to be reconsidered at the forthcoming meetings in Copenhagen.

sternite (ventral plate) is deeply emarginate, the distal one-half being divided (fig. 1) in some specimens, but it is more shallowly emarginate in others.

Wehrle (1924), in a study of the variation of the number of antennal segments among individuals of the red clover flower midge reared in New York, found that the normal flagellum of both sexes varied from 13 to 15 segments, the most common number being 14.

Even when amalgamation forming unusually long flagellar segments is found, the articulation being lost, or else where the distal segment may appear to be subdivided, there is often a question as to what segments are to be counted as integral units.

Dasineura flosculorum Kieffer is here regarded as a synonym of *D. leguminicola*. Kieffer apparently regarded his species to be distinct because the affected florets of Zigzag clover were abnormal on close inspection. His description of infested florets, however, agrees with descriptions of close examinations of similarly infested red clover florets in North America. Both Metcalfe (1933) and Barnes (1946) have regarded *D. flosculorum* to be almost certainly identical with *D. leguminicola*, and it appears best to suppress the name.

Metcalfe (1933) crossed North America midges from red clover with English specimens from red clover to prove that the two represented the same species.

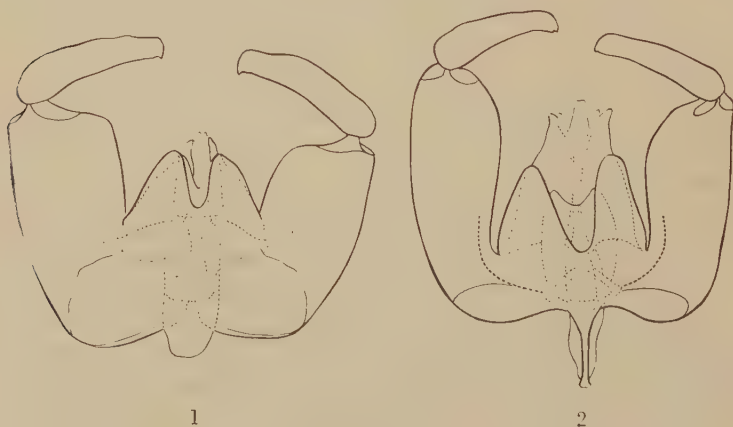


Fig. 1. *Dasineura leguminicola* (Lintner), male genitalia. Fig. 2. *D. gentneri*, n. sp.

Dasineura gentneri Pritchard, new species

White Clover Flower Midge

Adults of *Dasineura gentneri* closely resemble those of *D. leguminicola*, but the roots of the male basiforceps unite to form a strong, slender apodeme associated with a narrow, weakly developed sclerotization of the phallic structures. The tenth sternite (ventral plate) of the male genitalia is emarginate only on the distal one-fourth or one-fifth.

Male—Palpus with four segments, the first globular, the others successively increasing in length. Antenna with 2+14 segments (the thirteenth segment without a distal stem on one flagellum and the thirteenth and fourteenth segments amalgamated on the other); flagellum with distal stem of fourth segment about equal in length to node, the stems shorter on more proximal segments and somewhat longer on more distal segments. Wings hyaline, clothed with narrow, curved macrochaetae; R_5 reaching costa well before tip of wing. Legs clothed with lanceolate setae; tarsal claw with well-developed proximal tooth. Hypopygium (fig. 2) with tenth tergite (dorsal plate) bifid to form two triangular lobes attaining about three-fourths the length of the basiclaspers; tenth sternite (ventral plate) somewhat shorter than tenth tergite, broadly emarginate on about distal one-fifth; claspettes (the proximoventral, caudally directed projection of each basiforceps) nearly reaching end of basiforceps, rather slender distally and each terminating in two lobes bearing a single sensory seta on each lobe. Basiforceps each with the proximal root uniting with roots of phallic structure to form a slender, strongly sclerotized apodeme, bordered by a narrow, irregular, and thinner sclerotization. Length of wing, 0.85 mm.

Female—Similar to male except flagellar segments sessile, the fourth segment about twice as long as broad proximally. Ovipositor with ventral lobes very small, about one-sixth as long as lamellae. Length of wing, 1.5 mm.

Holotype—Male, TALENT, OREGON, September 27, 1951 (G. W. Bishop), reared from Ladino clover flower; in the Pritchard collection. *Paratypes*—Five ♂, 10 ♀, Central Point, Oregon, October 24, 1952, (G. W. Bishop) reared from Ladino clover; 2 ♂, 5 ♀, Grant's Pass, Oregon, October 25, 1951 (G. W. Bishop), reared from Ladino clover; 1 ♂, 15 ♀, Madras, Jefferson County, Oregon, September 4-5, 1952 (G. W. Bishop), reared from Ladino or alsike clover; 3 ♂, 10 ♀, Talent, Oregon (G. W. Bishop), reared from Ladino clover; 3 ♂, Grandview, Washington, July 2, 1952 (E. C. Klostermeyer), Ladino clover. One ♂, Albany, New York, July 3, 1906, white clover, (determined by Felt as *D. leguminicola*) was also examined.

The number of flagellar segments in the males studied varies from 12 to 14 segments, but most have 13 segments. The number of flagellar segments in the females examined varies from 11 to 13 segments, with most having 12 segments. It, therefore, appears that the number of flagellar segments in *Dasineura gentneri* tends to be less than in the closely related *D. leguminicola*.

The tenth sternite of the male genitalia appears to vary in having the distal emargination from about one-fifth to one-fourth its length.

This midge is named in honor of L. G. Gentner, because of his keen insight as to the possibility of it representing a misdetermined species.

The only possible record of this species in Europe is that by Metcalfe (1933). She found midge larvae in the florets of wild white clover, but was unable to rear the adults. It is noted that in her other studies she was unable to find any larvae of the red clover flower midge on white clover; and, therefore, it is possible that *Dasineura gentneri* occurs also in England.

Biological studies of *Dasineura gentneri* have been made by G. W. Bishop. His observations, to be published soon, indicate that the biology of this species differs considerably from that of *D. leguminicola*.

LITERATURE CITED

BARNES, H. F.

1946. Gall midges of economic importance, 2:1-160. Crosby Lockwood and Son Ltd., London.

CREEL, C. W. AND L. P. ROCKWOOD

1918. Controlling the clover-flower midge in the Pacific Northwest. U.S.D.A. Farmers' Bull. 971:1-12.

FELT, EPHRAIM PORTER

1915. A study of gall midges II. Appendix to 29th report of the state entomologist 1913. Bull N. Y. State Mus., 175:79-246.

LINTNER, J. A.

1879. The clover-seed fly—a new insect pest. Canad. Ent., 11:44.
1879. On *Cecidomyia leguminicola* n. sp. Canad. Ent., 11:121-124.

METCALFE, MARGOT E.

1933. *Dasyneura leguminicola* (Lint.) the clover seed midge. Ann. Appl. Biol., 20:185-204.

WEHRLE, LAWRENCE PAUL

1924. A study of the segmentation of the antennae of the clover-flower midge (*Dasyneura leguminicola*, Lintner). Ann. Ent. Soc. Amer., 17:416-418.
1929. The clover-flower midge (*Dasyneura leguminicola*, Lintner). Bull. Cornell Agric. Expt. Sta., 481:1-35.

A NEW SPECIES OF WEB-SPINNING SAWFLY
FEEDING UPON PINES *Tree Coll*(Hymenoptera, Pamphiliidae)¹

WOODROW W. MIDDLEKAUFF

University of California, Berkeley

The following description of a new species of pine feeding sawfly in the genus *Cephalcia* is given in advance of a larger revisionary work at the request of Mr. R. Lambert of the Canadian National Collection. This will make the name available and permit subsequent publication of a thesis on the bionomics of several Pamphiliidae by a Canadian student.

I wish to thank the following institutions for loan of material. Canadian National Collection, [CNC]; Museum of Comparative Zoology, [MCZ]; and United States National Museum, [USNM]. Specimens will be returned to the designated museums.

***Cephalcia marginata*, Middlekauff, new species**

Female: Length from collar to tip of abdomen, 10 mm.; length of wing, 11 mm. Color almost entirely black with the following exceptions: apical third of mandibles, ferruginous; spot on face between eye and antenna, a narrow band on postgena extending around posterior margin of head to vertical furrows with a short spur angling forward on postocular area, a spot on collar, the tegula, the lateral margins of abdominal segments, and a narrow line on apical margin of abdominal sternites 3–6, ivory yellow.

Wings hyaline at base, apical third lightly infuscated from base of stigma to apex. *Antenna* long, slender, with twenty-four segments; segments four and five together nearly as long as third. Head heavily and evenly rugose except for small impunctate area between eye and antenna. A distinct furrow on gena extending from near base of mandibles. Anterior and median portion of prescutum, median and lateral portions of scutum, basisternum and lower portion of episternum impunctate, shining.

Male: Length of body 10 mm., wing 10 mm. Color mostly black with the following exceptions: mandibles mostly yellowish red with cutting edges dark, reddish brown. Legs, except coxae and most of trochanters, yellow ocher. A spot on face between eye and antenna; a narrow band on posterior margin of head in postocular area; tegula and lateral angles of abdominal segments, ivory yellow. *Wings* hyaline.

Structure similar to female except for sexual differences.

Holotype: Female; BERTHIERVILLE, QUEBEC, CANADA, June 9, 1940 (L. Daviault); reared on *Pinus resinosa* Ait. [CNC].

Allotype: Male; Berthierville, Quebec, Canada, May 31, 1940 (L. Daviault); reared on *Pinus resinosa* Ait. [CNC].

Paratypes: 17 males; 12 females. QUEBEC, Berthierville, 2♀, June 5, 1940; 2♀, June 9, 1940; 1♂, May 29, 1940; 3♂, May 31, 1940; 3♂, June 1, 1940; 4♂, June 2, 1940; 3♂, June 3, 1940;

1 ♂, June 5, 1940 (all reared by L. Daviault on *Pinus resinosa* Ait.). Laniel, 1 ♀, June 17, 1940 (C. E. Atwood); on *Pinus resinosa* Ait., [CNC]. Covey Hill, 1 ♀, June 28, 1924 (T. Armstrong) [CNC]. Hemmingford, 1 ♀, June 7, 1924 (A. D. Baker) [CNC].

MASSACHUSETTS, 1 ♀, June, 1889, (J. G. Jack), about *P. banksiana* Lamb. [MCZ].

NEW YORK, Karner, 1 ♀, July 13; 1 ♀, July 19, 1901 (N.Y.S.). Bear Mt., 1 ♂, June 12, 1924 (Schott). [USNM]. PENNSYLVANIA, Charter Oak, 2 ♀, June 22, 1920 (J. K. Knull). [USNM]. VIRGINIA, 1 ♂, no additional data, [USNM].

This species is recognized by the distinctive markings enumerated above, especially those on the face and abdomen of both sexes and the reddish-yellow legs of the males.

Several of the paratype males show a small light spot in center of clypeus.

The female paratypes vary in body size from 9 to 12 mm., and in wing length from 10 to 12 mm.; the males vary in body length from 9 to 11 mm., and in wing length from 9 to 10 mm.



COLPODES BUCHANANI IN OREGON

BORYS MALKIN AND MELVILLE H. HATCH

University of Washington, Seattle, Wash.

While one of us was at the Museum of Comparative Zoology in July 1952, Dr. P. J. Darlington pointed out that the *Agonum* (*Anchomenus*) *sargentorum* described by us (1952 Pan-Pacific Ent., 28 (2): 107-108) from a single male taken at Eugene, Ore., in 1941 is a synonym of *Colpodes buchanani* Hope. Dr. Darlington had a single specimen taken at Portland, Ore. in 1931 by Joe Schuh. *Colpodes buchanani* is indigenous to southeastern Asia, being recorded from Bengal, Nepal, Ceylon, Sumatra, Java, Luzon, and Japan. The two Oregon records, separated as they are by a ten year interval, suggest that the species is established in this country. *Colpodes* is distinguished from *Agonum* by the more or less strongly bilobed penultimate tarsal segments, a character that is especially well developed in *buchanani*. Moreover, among our Northwestern species of *Agonum* with distinct pronotal hind angles *buchanani* is distinguished by its rufous color and the elytra which are bright shining viridescent except for the extreme margins.

AN UNUSUAL OCCURRENCE OF THREE SPERMATHECAE
IN A SPECIMEN OF HYSTRICHOPSYLLIA DIPPIEI

(Siphonaptera)

HAROLD E. STARK

*Plague Investigation Section, Public Health Service
15th Ave. and Lake St., San Francisco 18, California*

In the last few years there have been several articles on anomalies in Siphonaptera involving duplication of spermathecae. These previous articles dealt with fleas normally having on spermatheca, while this article reports duplication in a flea normally having two spermathecae and belonging to a very primitive genus. Holland (1934) wrote an article entitled, "A remarkable instance of retention of a double spermatheca in a Dolichopsyllid flea, *Opisocrostis bruneri* Baker." (The Canadian Entomologist, 75 : 175-176). This is the only reference to this condition observed in North American fleas. F. G. A. M. Smit reviewed previous literature and suggested some viewpoints regarding this condition in female fleas and illustrated a female *Nosopsyllus fasciatus* (Bosc) having paired spermathecae (Monstrosities in Siphonaptera, Tijdschrift voor Entomologie, 90; 35-42, 1947 [1949]. Smit (1949) published a second article (Monstrosities in Siphonaptera II, Entomologische Berichten 12: 436-437).

Early in 1949 a specimen of *Hystrichopsylla dippiei* Rothschild with three spermathecae was observed among fleas routinely being mounted at the San Francisco Field Station. All three spermathecae are about the same size. Two are placed together between the lateral parts of the VII sternum and are apparently paired. The third spermatheca is placed farther posteriorly between the VIII tergum and sternum and IX segment. The head is about 1/15 shorter than the other two. This difference in size is so slight that it may be observed only by measurement. The spermathecae are slightly smaller than those of similar specimens of *H. dippiei* found in the San Francisco Bay region. It may be possible that all three spermathecae are functional since ducts may be seen entering them. Unfortunately, the bleaching action of NaOH treatment has made it impossible to trace these ducts to the bursa copulatrix which is barely discernible. A careful dissection of this flea before bleaching might have answered some of the following questions better than

do the illustrations of sclerotized plates presented in the drawing (fig. 1).

This species of *Hystrichopsylla* was collected at Paradise Cove, Marin County, California, April 11, 1946 by E. L. Kessel. Host: *Scapanus* sp.

It is generally considered that fleas possessing two spermathecae are more primitive than those with a single spermatheca, and *Hystrichopsylla* is probably one of the most primitive genera of fleas. In 1921, Jordan (A link between the double and single receptacula seminis of Siphonaptera. Ectoparasites, 1: 127.) observed a species of flea normally having one spermatheca smaller than the other, suggesting an intermediate stage between the paired and single condition. It appears to me that this article suggests that the ancestral forms of present-day fleas having a single spermatheca formerly had paired spermathecae and lost one through the course of evolution.

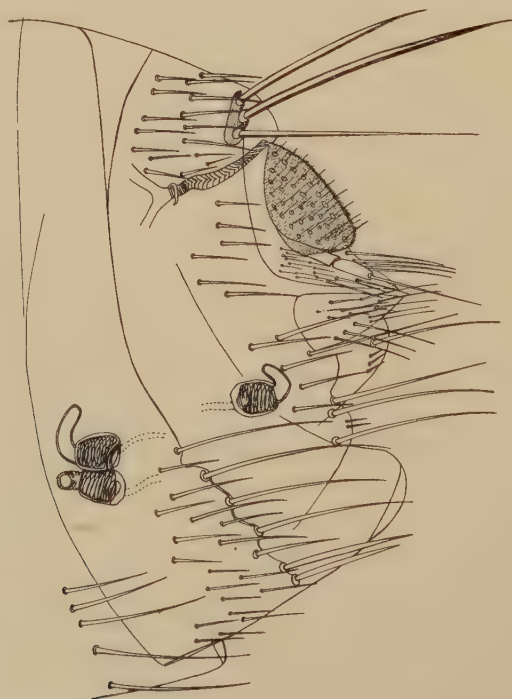


Fig. 1. *Hystrichopsylla gigas dippiei* Roths., with three spermathecae.

To explain the presence of a third spermatheca is not possible from evidence deduced from the morphology of an otherwise normal *Hystrichopsylla* specimen. One supposition might be that ancestral fleas once had four spermathecae and this flea exhibits three as is normally found in the *Tabanidae* (Diptera), the third spermatheca being all that remains of the second pair. From a genetic point of view, any explanation of the processes that have caused this condition from the evidence derived from this flea and other single mounted specimens showing similar anomalous conditions is not only useless but quite pointless. The evidence necessary for an explanation as to the origin would have to come from genetic analysis, progeny tests, etc. Certain limited suppositions may be deduced on a morphological basis.

In his second article on monstrosities of Siphonaptera (op.cit.) Smit describes a female *Xenopsylla cheopis* with paired spermathecae and paired bursae copulatrices. He concludes that this is not atavism but merely a duplication of organs, and that this lends uncertainty to the theory that the ductus obturatorius is a remnant of the ductus seminalis of the ancestral second spermatheca. Therefore another supposition regarding this specimen of *Hystrichopsylla* would hold that anomalous duplication has occurred, such as six toes in some mammals (five being normal since descendancy from early amphibians). To explain the manner of this duplication, causing a third spermatheca, would be a hazardous guess, and answers to these other questions are beyond the scope of this paper. It is hoped that this short description, with illustrative drawing, will serve as a small steppingstone in the final analysis of this unusual condition among fleas and other insects.

SYSTEMATIC STUDIES IN PLECOPTERA. By William E. Ricker, Indiana University Publications, Science Series No. 18. Pp. 1-200, 154 text figs. The Indiana Univ. Press, Bloomington, 1952. Price \$3.50.

This work is divided into three parts: I. The genus *Nemoura* in North America (pp. 10-61); II. The family Perlodidae (pp. 62-145); and III. Miscellaneous descriptions and revisions. There is also a bibliography and an index. Dr. Ricker was able to study the late Dr. T. H. Frison's collection and notes; in addition he borrowed material from museums and private individuals both here and abroad. His paper contains many keys, including some to mature nymphs; 1 new genus, 30 new subgenera, 32 new species, 1 new specific name, and many new synonymies are proposed.—H.B.L.

A NEW SPECIES AND SUBSPECIES OF AMBRYUS
FROM GUATEMALA

(Hemiptera: Naucoridae)

IRA LA RIVERS

University of Nevada, Reno

The following descriptions are based upon material submitted for examination by Dr. H. B. Hungerford, and are offered at this time so they will be available for a forthcoming report on Guatemalan aquatic Hemiptera.

Ambrysus hungerfordi spicatus La Rivers, subspecies novum

General appearance: small, rotund for the genus; size 7–8 mm. long, 5–6 mm. wide. Dorsum bicolored, lighter anteriorly, darker posteriorly, glistening but not polished. Venter strongly contrastingly colored with blackish-browns and yellows.

Head: Ground-color light yellow, shiny, impunctate or essentially so; two prominent, median, longitudinal brown lines beginning in anterior quarter of head and becoming increasingly wide posteriorly, fusing there with a conspicuous bilobed brownish spot. Front widely but smoothly protuberant between eyes. Viewed from behind, eyes insignificantly protuberant above head surface. Head shallowly set into anterior pronotal border.

Pronotum: Shiny, but not polished, roughly and shallowly punctate; ground-color light yellowish-brown, with varied darker mottling; edges smooth, unserrate, conspicuously set with long, but not dense, yellowish flying hairs: per cent of lateral pronotal curvature is 15% (85:13); postero-lateral angles usually present, but not conspicuous, and approximately at widest point of pronotum.

Hemelytra: Basically dark, weakly variegate blackish and brownish, lighter along embolium; densely, shallowly and roughly punctate, each puncture seating a white spot; embolium tending to be somewhat short and wide for the genus (length is 36 per cent of width, 30:83), but definitely not inflated, light yellow on anterior two-thirds, dark on posterior one-third, edged with sparse, yellow hairs. Hemelytra moderately exposing lateral connexival edges, postero-lateral connexival angles moderately spined; connexival edges densely, yellowishly pilose; hemelytra just attaining abdominal tip.

Venter: Yellowish-brown, abdomen densely furred with yellowish, short, hydrofuge pelt; connexival postero-lateral angles sharply, rather finely spinose, the spination quite evident on all segments except I; all connexival edges except I-II are strongly and markedly dentate or serrate, and the posterior half of II may show incipient serration. Female subgenital plate smoothly and moderately concave at the tip, lateral angles blunt, rounded. Male genital process short, rather spinose, straight, leaning outwardly. Female abdominal segment V with greatly enlarged secondary connexival spinose angle, which is the chief distinguishing feature of the subspecies.

Legs: Prolegs—coxa and trochanter well developed, femora greatly incrassate; smooth, shiny, yellow; combined tibia-tarsus, when closed, attaining

adjacent (proximal) end of femur. Mesolegs—smooth, shiny, yellow, narrow; femur flattened, tibia square, reddish spination developed along the “corners”; distal end ventrally with one complete, prominent, transverse row of spines set in a solid row across extreme tip instead of the usual two rows (in this case, the second row is reduced to 2–3 spines on each side, leaving the mid-section bare); tarsus obscurely 3-segmented, first segment short, inconspicuous, segments II–III long, narrow, terminating in two weakly curved claws. Metalegs—larger replicas of the mesolegs.

Type locality.—GUATEMALA, Rio de Paz of San Diego, Pan-American Highway, 15 (iv) 47, R. R. Miller (Univ. Kansas collection).

Location of types.—Holotype, male, and allotype in collection of the Snow Museum of the University of Kansas at Lawrence. One paratype each in the collections of the U. S. National Museum and the University of Michigan.

Material examined:—GUATEMALA, Cuilapa, 10 km. SW of, 21(iv)46, R. R. Miller, paratype (USNM); MEXICO, Chiapas (Ixtapa), 27(iv)41, I. J. Cantrall, paratype (UM).

With a desire to keep the key to Mexican ambrysi (in press) up to date, the following couplet is offered as a means of including *A. h. spicatus* in that key:

- 9 (8). Secondary postero-lateral connexival angle of abdominal sternite V greatly enlarged caudally, the primary angle reduced to a smooth, broad curve (see illustration).
..... *hungerfordi* *spicatus*
..... Secondary postero-lateral connexival angle of abdominal sternite V reduced to a smooth curve, the primary angle dominant, and sharp-pointed. (remainder of *hungerfordi* complex)

The typical subspecies, *A. h. hungerfordi* Usinger, 1946, is known from northern to southern Mexico; further collecting may possibly extend its range into extreme southwestern United States, and *A. h. spicatus* appears to be the southernmost known segment of the species. The *pubicus* group of *Ambrysus*, to which *A. hungerfordi* belongs, is a distinctive, variable section of the genus obviously Mexican in origin. Although *A. pubicus* has been previously reported in error from the United States, a recently discovered *bona fide* member of the group extends its range northward into southern Nevada (in press), which very probably constitutes the true northern limits of the group.

Ambrysus dyticus La Rivers, species novum

General appearance: a mottled species of medium size for the genus; size 9.5–11.0 mm. long, 6.75–7.5 mm. wide. Dorsum, while variegated brown and yellow, is lighter anteriorly, darker posteriorly; shiny but slightly shagreened. Venter rich yellow except along lighter lateral borders, which darken a bit anteriorly.

Head: Ground-color whitish-yellow to deep yellow with a variable development of darker brownish spotting and streaking, taking the form of two median series of dots, developing into two basal spots caudally. Surface shiny, smooth, minutely punctulate. When oriented so that dorsal plane is perpendicular to line-of-vision (i.e., the greatest amount of dorsum exposed to view) front of head is seen to be slightly and truncately protuberant before eyes. Eyes greyish, outer and inner margins only slightly curved, posterior margin strongly curved; eyes essentially flush with the head surface. Head broadly and rather shallowly seated in anterior pronotal border. Labrum same color as head front.

Pronotum: Shiny, smooth, minutely punctulate, incipient transverse rugulosities developing centrally behind region of deepest head penetration. Ground-color whitish-yellow, with a variable development of brownish mottling and dotting on disc. Broad, whitish, posterior pronotal border conspicuously separated by a transverse line (interrupted in the middle) from the varicolored disc. Lateral edges smooth, non-serrate, without any pilosity: when head is firmly seated into anterior pronotal border, outer edge of pronotum and eye form essentially a smooth contour, i.e., the emargination caused by the juncture being non-existent or insignificant. Per cent of pronotal lateral curvature is 15% (40:6). Postero-lateral angles quasi-distinct, well rounded.

Hemelytra: The most contrastingly mottled portion of the dorsum, heavy brown-and-yellow variegation, the brown areas conspicuously white-punctate: when best developed, the pattern of light areas consists of a large, light area on embolium, a generally slightly darker, irregular spot at postero-internal embolar angle, a light border along anterior two-thirds of corium-membrane juncture, wider posteriorly and giving rise to a forward-projecting branch medially; a wide, vague light area adjacent to outer hemelytral border; clavus light along sutures, and medially. Surface shiny but not polished, shagreened. Embolium moderately stout for the genus (width is 33 per cent of length, 15:45), smooth, non-pilose laterally; anterior two-thirds to three-fourths yellowish, posterior part dark brown. Hemelytra strongly exposing lateral connexival margins, which are yellowish, with dark spots at connexival junctures. Postero-lateral connexival angles weak-angulate, non-spinose. Hemelytra just, or not quite, attaining abdominal tip.

Venter: Generally very light yellow, covered with pale hydrofuge pelt; embolar venter paler externally; postero-lateral connexival angles variably developed, anteriorly to posteriorly, nearly right-angled on segments I-II, gradually developing a somewhat caudally-slanted aspect to the angles on

segments III-V, each angle, from I to V, protruding progressively more laterally; margins of segments I-II absolutely smooth, of segments III-V minutely irregular. Female subgenital plate quadrisinuate across the broad tip, this sinuosity varying from a nearly level line to one in which the lateral sinuosities become weak-angulate and may extend caudally farther than the median

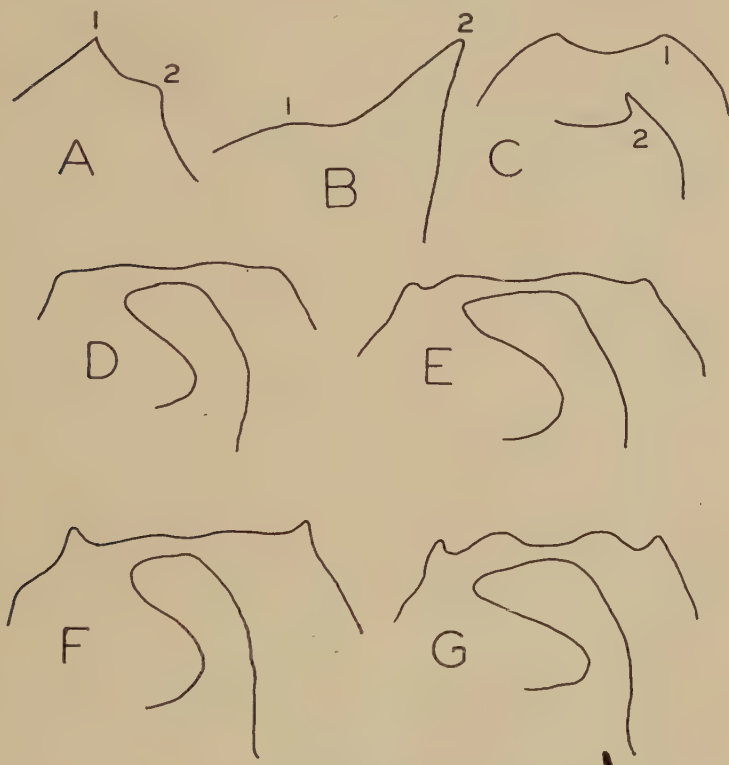


Fig. A. Region of postero-lateral connexival angle on left side of abdominal sternite V, of *Ambrysus hungerfordi hungerfordi* Usinger, ventral view. (1) Primary postero-lateral connexival angle. (2) Secondary postero-lateral connexival angle.

Fig. B. Region of postero-lateral connexival angle on left side of abdominal sternite V, of *Ambrysus hungerfordi spicatus* n. subsp., ventral view. (1) Primary postero-lateral connexival angle. (2) Secondary postero-lateral connexival angle.

Fig. C. Accessory genitalic structures of *Ambrysus hungerfordi spicatus*: (1) outline of tip of female subgenital plate; (2) outline of male genital process.

Figs. D-G. Showing four variations of the female subgenital plate and the male genital process of *Ambrysus dyticus* n. sp.

sinuosities, which are always low and rounded. Male genital process similarly variable in shape, well developed, from club- to boot-shaped (see illustration).

Legs: Prolegs—whitish yellow, smooth, shiny, coxa and trochanter well developed, femur typically incrassate, combined tibia-tarsus narrow, when closed against femur just attaining adjacent (proximal) end of femur. Tarsus one segmented. Mesolegs—whitish-yellow, smooth, shiny, femur flattened, tibia somewhat square, each corner bearing variable red-spination; tibia with distal end ventrally with two prominent, transverse rows of spines, the terminal row set solidly across tibial apex, the secondary or proximal row incomplete on outer or anterior edge, slightly more than half of the length of terminal row. Tarsus smooth, long, narrow, same color as tibia, obscurely three-segmented, the first segment inconspicuous, the others long, terminating in two slender, moderately curved claws. Metalegs—larger replicas of the mesolegs.

Type locality: GUATEMALA, Lake Ayerza, 11(v)47, R. R. Miller (UK).

Location of types: Holotype male, allotype and several paratypes in the collection of the Snow Museum, University of Kansas, Lawrence; one paratype in the collection of the University of Michigan.

Material examined: GUATEMALA, Cuilapa, 10 km. SW of, 21(iv)46, R. R. Miller, paratype (UM).

Ambrysus dyticus seems to be a southern development of the *signoreti* group of the genus, most closely related in accessory genitalic structures to the recently described *Ambrysus occidentalis* La Rivers, 1951, from extreme southwestern United States, differing from the latter chiefly in smaller size and much reduced connexival spination. In actuality, the two species are probably not particularly close within the group, since, despite the gross similarity of female subgenital plates and male genital processes, there is some difference in body proportions and convexity.

REFERENCES

LA RIVERS, IRA

- 1951. A revision of the genus *Ambrysus* in the United States. (Hemiptera: Naucoridae). Univ. Calif. Publ. Entom., 8 (7): 277-338, illus.
- 1953. New gelastocorid and naucorid records and miscellaneous notes, with a description of the new species *Ambrysus amargosus* (Hemiptera: Naucoridae). Wasmann Jour. Biol. 11 (1): 83-96, 1 text fig.
- [In press.] The *Ambrysus* of Mexico (Hemiptera: Naucoridae). Univ. Kansas Sci. Bull.

USINGER, ROBERT L.

- 1946. Notes and descriptions of *Ambrysus* Stål with an account of the life history of *Ambrysus mormon* Montd. (Hemiptera, Naucoridae). Univ. Kansas Sci. Bull., 31 (1): 185-210, incl. pl. X.

TRIAMOMA RUBIDA SONORIANA INFECTED WITH
TRYPANOSOMA CRUZI IN SONORA, MEXICO¹

RAYMOND E. RYCKMAN

Department of Entomology, School of Tropical and Preventive Medicine,
Loma Linda, California

Triatominae have been reported infected with *Trypanosoma cruzi* Chagas from seven states in northern Mexico. Mazzotti (1940) reported the following species infected: *Dipetalogaster maximus* (Uhler) at La Paz, Baja California; *Triatoma rubida* (Uhler) at Imala, Mocorito, Novolato, and Culiacan in the state of Sinaloa. Pequeño (1947) reported *Triatoma gerstaeckeri* (Stål) infected in the states of Nuevo Leon, Tamaulipas and Coahuila; infected *Triatoma* were also reported from Durango and Chihuahua by the same author.

A search of the literature and correspondence with workers in Mexico and the United States indicated that infected Triatominae have not previously been reported from the state of Sonora, Mexico.

Bernard Gerard collected two nymphs (5th instar) of *T. rubida sonoriensis* (Del Ponte) 5 miles north of Guaymas, Sonora, Mexico on February 15, 1951. Fecal droppings from both specimens were microscopically examined and found to contain flagellates.

Intestinal contents of the male bug were subcutaneously injected into four white rats when the latter were eight days of age. At a subsequent passage of the trypanosomes, six species of bugs were fed on infected rats on the twenty-first, twenty-fourth, twenty-seventh and forty-fifth days after inoculation. These species became infected as a result of feeding on the infected rats; they were *Triatoma phyllosoma pallidipennis* (Stål), *T. rubida sonoriensis* (Del Ponte), *T. protracta* (Uhler), *T. infestans* Klug, *Mestor megistus* (Burmeister) and *Rhodnius prolixus* Stål. Blood smears made from rat tail blood and stained with Wright's and Field's stains revealed flagellates morphologically similar to *Trypanosoma cruzi*. When sectioned², cardiac muscle fibers contained clusters of Leishmania bodies typical of *Trypanosoma cruzi*.

The strain of *Trypanosoma cruzi* isolated from bugs collected at Guaymas, Sonora, Mexico, has produced a higher blood para-

¹ This investigation was supported in part by a research grant (E-173) from the National Institutes of Health, Public Health Service.

² ACKNOWLEDGMENT—Cardiac sections of the infected rats were made in the Department of Pathology, School of Medicine, College of Medical Evangelists, by S. Rene Modglin, M.D.

sitemia in young white rats than strains isolated by the author from *Triatoma* collected in nature at Riverside, California. The Sonoran strain frequently produces a blood parasitemia of thirty flagellates per high-dry field, and counts as high as forty-seven have been recorded. A culture of this strain is being maintained by the Microbiological Institute, U.S. Public Health Service, Bethesda, Maryland.

The author collected two adults of *T. rubida sonoriensis* (♂♀) six miles north of Hermosillo, Sonora, Mexico, on April 26, 1952. Feces examined from the female were swarming with flagellates; feces of the male were negative. Infective fecal material from the female bug was administered by intraperitoneal injection into two white rats when they were nine days of age. Blood smears of tail blood from both rats contained motile flagellates thirty-five days after inoculation.

LITERATURE CITED

MAZZOTTI, LUIS

1940. Triatomídeos de México y su Infección Natural por *Trypanosoma cruzi* Chagas. *Medicina Revista Mexicana*, 20 (358): 95-109.

PEQUENO, E. ACUIRRE

1947. Una Nueva Localidad en la Distribución Geográfica de los Triatomas Naturalmente Infectados por *Trypanosoma cruzi* en la República Mexicana. *Archivos Médicos Mexicanos*, 5 (8): 350-358.

NOTES ON THE ECOLOGY OF BOMBUS SONORUS IN ORANGE COUNTY, CALIFORNIA AND NEW PARASITE RECORDS

(Hymenoptera: Bombidae, Diptera: Sarcophagidae, Conopidae, Phoridae)

RAYMOND E. RYCKMAN

Department of Entomology, School of Tropical and Preventive Medicine,
Loma Linda, California

During the summer and fall of 1951, several populous bumblebee nests were encountered while field research was being conducted near San Juan Capistrano, Orange County, California. Five nests were studied, all underground in abandoned rodent burrows or in deep natural crevices in the soil.

T. H. Frison (1926) records a species of calliphorid fly, *Brachycomia sarcophagina* (Townsend), from *Bombus auricomus* (Robertson), *B. americanorum* (Fabricius), *B. bimaculatus* Cresson,



Fig. 1. Abdomens of *Bombus sonorus* Say, dorsal and ventral, to show a dipterous puparium in each.

B. vagans Smith, and *B. fervidus* (Fabricius). Davidson in California reared a species of *Brachicoma* from the larvae of *Bombus fervidus*; it was named *B. davidsoni* by Coquillett.

On September 25, 1951, a total of 116 adult bees were captured from nest No. 1. Subsequent visits were not made to this nest until November 1, at which time only a few dead and dying bees remained. Much of the comb had been eaten by larvae of the dried fruit moth, *Vitula serratilineola* Ragonot.

PARASITES

The 116 active bees collected from nest No. 1 on September 25 were placed in a cyanide jar for a short time and then stored overnight in a refrigerator at a temperature of 40° F. When removed from the refrigerator, seven dipterous maggots crawled from the bees. These maggots were *Sarcophaga (Helicobia) morionella* Aldrich; they soon pupated and all had emerged by October 26, 1951. Dead and dying bees collected on November 1 were examined for parasites. Dipterous pupae filled the abdominal cavities (fig. 1.). Of the three bees collected from nest No. 3 on November 1, one contained a large dipterous larvae in the abdominal cavity.

Parasitic Diptera reared from *Bombus sonorus* Say are:

Sarcophagidae

Sarcophaga (Helicobia) morionella Aldrich. Det. by C. W. Sabrosky.

Sarcophaga litorosa Reinhardt. Det by C. W. Sabrosky.

Sarcophaga tuberosa sarracenioides Aldrich. Det by H. R. Dodge.

Conopidae

Physocephala sp. (Wings distorted on emergence). Det. by C. W. Sabrosky.

Non-parasitic Diptera reared from nest of *Bombus sonorus* Say:

Phoridae

Megaselia sp. Det. by W. W. Wirth.

Conicera atra (Meigen). Det by W. W. Wirth.

The author is indebted to W. W. Wirth, C. W. Sabrosky and H. R. Dodge for identifying the specimens and to W. R. Thompson and H. E. Milliron for checking their files for records of Diptera parasitic on bumblebees. Representative specimens of all species mentioned have been retained by the U.S. National Museum and the Communicable Disease Center, Atlanta, Georgia.

LITERATURE CITED

FRISON, THEODORE H.

1926. Contribution to the knowledge of the interrelations of bumblebees of Illinois with their animate environment. *Annals of the Entomological Society of America*, 19 (2): 203-235, incl. pl. xvii.

R APHIDOLOGICAL GLEANINGS

(Homoptera)

F. C. HOTTES

Through the generosity and photographic skill of Dr. and Mrs. Börner I have acquired a copy of Food Plant Catalogue of the Aphididae of U.S.S.R. published in the Russian language in 1929 by the renowned aphidologist A. K. Mordvilko. From this work, I wish to call attention to the following: On page 55 he lists from Rosoideae *Neolachnus rosae* Cholodkovsky. Mordvilko's description of the genus, which is not indicated as new, is very inadequate, his remarks being limited to the end of the rostrum, and to a pigmented spot near the stigma of the wing. He further questions if *Lachnus subterraneus* Del Guercio is not a migrant of *Neolachnus rosae*. The genus *Neolachnus* is not listed by Neave in his Nomenclator Zoologicus (vols. III or V). However I have found two references to this genus, one by Judenko, who devotes almost three pages to it. His discussion is in Polish, except for about one page in English. The genus is also listed by Börner who gives the type as *rosae* Chol. Börner also indicates that this genus is a synonym of *Macuolachnus* described by Gaumont in 1920 with the same species as type. Both genera are placed as synonyms of *Lachnus* by Börner.

On page 34, *Paracerataphis tremulae* Mordv. (gen.n., sp.n.) is listed, the material having been taken on the under side of the leaves of Aspen growing in the vicinity of Vladivostok. Neither the genus or species are described in full, Mordvilko limiting his remarks to the fact that the genus is close to *Cerataphis* Lichtenstein but with 4-segmented antennae. He describes the larvae as being ash-gray. There are only two generations of virgins annually. *Paracerataphis tremulae* is said to be an anolocyclic form, having lost its primary host in the U.S.S.R. The genus *Paracerataphis* is not listed by Neave in his Nomenclator Zoologicus (vols. III or V). Neither the genus or species is recorded in the volume of the Zoological Record which covers the literature for 1929. I can find only one reference to *Paracerataphis*, that of Börner who places it as a synonym of *Doraphis*.

On page 40, *Tuberculatus multituberculatus* sp.n. is listed, this is followed by *Tuberculatus flavus* sp.n. Both species are listed from the under sides of the leaves of *Quercus cerris*; both are said to be light ye'low, and the adult virgins always alate. On

page 88, *Hyalopterus skorkini* sp. n. is listed. The host is given as *Phragmites communis*. I have not been able to locate references in Aphid literature to the three species mentioned above, nor do they appear to be listed in the volumes of the Zoological Record available to me. Their status as species may be questioned.

On page 57, *Anuraphis distincta* Mordvilko is listed from *Amagdalus nana*; this species is not here listed as new, but perhaps should be. The antennal tubercles of this species are said to be longer than those of *Anuraphis persicae* Sulzer, being two and one-half to three times longer than their diameter. On page 79, *Fullawayella lonicerae* Mordvilko is listed from the floral parts of *Lonicera chrysantha*; it is not indicated as a new species, but probably should be. The antennal tubercles are described as extending more toward each other than in *Myzoides*. The radial sector is described as strongly convex, and the veins as being bordered, ("are smokily striped"). On page 91, *Brachycolus asparagi* Mordvilko is listed from *Asparagus*. This species is not described further. I have not been able to locate the three species mentioned above in Aphid literature, nor do they appear to be listed in the volumes of the Zoological Record available to me.

Hartig, in 1841, published a paper which he called, "Versuch einer Eintheilung der Pflanzenläuse (Phytophthires Burm.) nach der Flügelbildung." In it he makes curious use of the letter "m" after two previously described genera. The names thus characterized must be credited to him, despite the fact that they were still-born. He made use of the terms as follows: on page 367, "*Gattung Lachnus m. zum Theil Lachnus Illiger*." This is followed by a rather complete description of the genus and a listing of species, some of which are described as new. On page 368 the genus *Aphis* is described as follows: "*Aphis m. zum Theil Aphis Lin. Fabr.*" Then follows a description of the genus and a listing of species, some of which are described as new. On page 366 the genus *Chermes* is treated in a similar manner. It is quite clear what Hartig had in mind to do, but this method was faulty.

Not being able to locate in this country a copy of an aphid paper published by Passerini in 1857, a photo copy has been made available to me by a European colleague who has access to a library rich in old and rare entomological literature. Hagen in his *Bibliotheca Entomologica*, zweiter Band, p. 31, cites this paper as follows: "Gli Afidi. Giornale i Giardini. XII. Giugno, 1857. 8.

pg. 20." Hagen however in error credits the paper to Carlo Passerini who died in March of 1857. The correct author was G. (Giovanni) Passerini, who at times also indicated his given name by the letter J.

As a rule the paper printed by Passerini in 1860 is considered to be a reprint of this 1857 paper. This is not true, and Horn and Schenkling in their *Index Litterature Entomologicae* are in error in so citing it, in band III p. 919. The photo copy supplied me is from a reprint ("estratto") which must be as rare as the original. The paper appears to deal with the biology and control of Aphids in general, and does not deal with the taxonomy of the family Aphididae, lacking the following sections: *Prospetto Dei Generi Della Famiglia Degli Afidi*, (which in the 1860 paper begins on page 27), *Indice Delle Specie Di Afidi Osservate Finora In Italia* (which in the 1860 paper begins on page 31), *Annotationes Diagnosticae* (which in the 1860 paper begins on page 34). Other differences which have been noted, some of them very minor, such as the change of a species name, are as follows: The 1857 paper lacks one footnote and has one that the 1860 paper does not have. The references cited are not always the same, and sometimes not given at all in the 1857 paper. The content of the following pages as given in the 1860 paper differs slightly from that found on corresponding pages of the 1857 paper. Page 5 differs from page 3, page 11 differs from page 8, by having the paragraph which begins, "Non e pero" and a long footnote. Page 15 differs from page 12, as does page 16 from page 12. Page 17 and 18 differ slightly from pages 13 and 14, as do pages 19 and 20 from page 16. The 1857 paper ends on page 24 of the 1860 paper where the paragraph which begins "In onta all" starts. However the 1860 paper lacks the footnote at the end of the 1857 paper. It will be noted that the 1860 paper has material on pages 24, 25 and 26 which the 1857 paper does not have.

The 1860 paper by Passerini is best known in its reprint form. I do not know of an original copy in America, the Journal in which it was printed is extremely rare.

Aphid workers who have followed Wilson and Theobald in their determination of *Cinara pini* (L.) have been perpetuating their error. The species they determined as *Cinara pini* (L.) should be called *Cinara pinea* (Mordvilko), a species frequently referred to as *Cinara pineti* (Koch).

Koch in his work listed and described a species which he had misidentified as *Lachnus pineti* (Fabricius). Article 31 of the Code states that a trivial name based upon a misidentification cannot be accepted as an available name for the species in question. There is in fact no such name as *Lachnus pineti* Koch, all that there is, is Koch's misidentification of *Lachnus pineti* (Fabricius). The true *Cinara pini* (L.) which occurs in England was apparently not treated by Theobald, in his Monograph. It may be quickly separated from *Cinara pinea* by the presence of a median mesosternal tubercle. I have not seen material of *C. pini* (L.) from America, it is the species Mordvilko called *Lachnus nudus* DeGeer.

One page 3 of what appears to be an addendum following page 236 of Mordvilko's vol. 1, "Insects Hemipteres, Fauna De La Russie," Mordvilko indicates and may describe the genus *Chaitosiphon* as new. A genus by that spelling has not been recorded. However on page 71 of the same work Mordvilko describes as new the genus *Chaetosiphon*. Mordvilko mentions no type in connection with either name, and if *Chaitosiphon* is not a misspelling of *Chaetosiphon* the two genera would appear to have the following status: Börner has set the type of *Chaetosiphon* as *Capitophorus chaetosiphon* Nevsky not described until 1928, *Chaitosiphon* has not been recognized and may be a nomen nudum.

In his 1860 paper Passerini published as new *Siphonophora lactucae*. Koch had in 1855 misidentified a species which he described and called *Siphonophora lactucae*. Koch credited the species to Fabricius. Lambers has considered the *lactucae* described by Passerini as a homonym of the species described by Koch and has credited the species to him. There seems to be some question as to just what species Koch called *lactucae*, most likely he had the *sonchi* of Linnaeus, as indicated by Theobald. The species cannot be credited to Koch, all that we have is Koch's misidentified *Siphonophora lactucae* (Fabricius). Hence the name Passerini proposed has priority over *Acyrtosiphon (Lactucobium) scariolae* Nevsky, 1929.

Recently the late Dr. L. P. Wehrle and I described as new *Aphis piutapa*. At that time I had not seen specimens of *Aphis tetrapteralis* Cockerell. Since that time I have seen the type of *tetrapteralis* and additional specimens determined as such by Professor Palmer, and many additional specimens sent to me unidentified from Arizona. Despite differences which may be noted in

published descriptions the two species appear to be the same, the shape of the cauda being very variable in *tetrapteralis* as well as the number of sensoria on the third antennal segment. Dr. Dickson has sent me material of the species described by him as *Pergandeida cahuille*; it also appears to be a synonym of *Aphis tetrapteralis*.

In a letter sent to Réaumur in 1748, DeGeer, records some of his observations made in 1745. These were published in 1755 under the title, "Secondes Observations, sur les Pucerons du prunier, et en particulier sur leur accouplement," in the second volume, *Mémoires de Mathématique et de Physique*, pp. 469-473, pl. XVII. I am not aware of a reference to this paper in aphid literature, either economic or taxonomic. DeGeer does not mention it in his work published in 1773. It seems well that attention be called to this paper so that it may be added to the extensive bibliography of *Hyalopterus pruni* (Goeffroy).

In a paper called "Aphid homonyms" which I published in 1930, I gave the name *Hyadaphis mellifera* to the species Schrank in 1801 had called *Aphis xylostei*, which was a homonym. At that time I was not aware of some of the information herewith presented, some of which was not yet in print. In view of the fact that Kirkaldy made *Aphis xylostei* Schrank type of the genus *Hyadaphis* which he described in 1904, it seems important to call attention to the synonymy of this species despite the fact that I am not now in a position to determine the specific name that must hereafter apply to the species described by Schrank.

Aphis xylostei Schrank, 1801, a homonym.

Aphis sii Koch, 1855. This species was placed as a synonym of the above species by Börner and Schilder in 1932. Koch placed the species described by Schrank in the genus *Rhopalosiphum*. Despite placing the species *sii* and *xylostei* in different genera, Koch's descriptions have much in common. This synonymy was followed by Dr. Lambers in 1934. Kloet and Hincks in their Check List of British Insects 1945 use this name.

Siphocoryne foeniculi Passerini, 1860. In a copy of Sorauer, Handbuch der Pflanzenkrankheiten, corrected by Dr. Börner and sent to me in 1949, Dr. Börner has replaced *Hyadaphis sii* (Koch) by *Hyadaphis foeniculi* (Passerini), on what grounds I do not know.

Hyadaphis hyadaphis Kirkaldy, 1905. Kirkaldy proposed this name to replace the name *xylostei* Schrank. It appears to have been overlooked by aphid taxonomists.

Hyadaphis conii (Davidson), 1909. Davidson placed the species *conii* described by him as a synonym of *xylostei* in 1914.

noticed
Aphid L.
(Nov. 1953)
by Mr.
H. G. G.

Hyadaphis conicellum Theobald, 1925. This species was placed as a synonym of the species described by Schrank by Lambers in 1934.

Hyadaphis mellijera Hottes, 1930.

Hyadaphis schranki Lambers, 1931.

In a paper called "The evolution of cycles and the origin of heteroecy (migrations) in plant lice," Mordvilko in 1928 proposed the name *Drepanosiphum californicum* for *D. platanoides* Wilson, 1909. This name seems to have been overlooked. I do not find it in the volumes of the Zoological Record available to me. It is not listed in the Food Plant Catalogue of Aphids by Dr. Patch. Wilson described the oviparous females as being alate. This is not true for *Drepanosiphum platanoides* Schrank, under which Wilson described this species.

In the issue of the Zoologischer Anzeiger for March 11, 1895, Mordvilko described by means of a key to the genus *Lachnus*, several species which he indicated as new. As a rule these species are said to have been described by him in: Raboty iz Laboratorii Zoologicheskago Kabineta I. Varshavskago Universiteta, 1895. For some time, I have concerned myself with the problem of which paper has priority. In the course of doing this I have experienced great difficulty due to the extreme rarity of the periodical in which the paper was published. However, I can now report that the paper was not originally published in Raboty iz Laboratorii Zoologicheskago Kabineta Varshavskago Universiteta, which has been translated for me as "Contributions of the Laboratory of the Zoological Department of the Imperial University of Warsaw," but in Warsaw Universitet Izviestiià. The title of this paper is rarely given; Cholodkovsky cites it in Russian; Dr. Patch cites it in her Food Plant Catalogue as follows: K faunie i anatomii sem' [i] Aphididae Privislinskago Karaia. The title is given in Annals of the Entomological Society of America, vol. XXXIII, p. 490 as, "On the Fauna and Anatomy of the Family Aphididae of the Visla Region"; here however the pages are cited incorrectly.

As printed and bound in the copy of Izviestiià now in the Library of Congress, which by the way is the only complete volume of the year 1894-95 I have been able to locate, the paper is divided into parts, no. 6: 1-16; no. 7: 17-48; no. 8: 49-80; no. 9: 81-112; issued on the following dates: no. 6: Sept. 30, 1894, no. 7: Oct. 31, 1894, no. 8: Nov. 30, 1894, no. 9: Dec. 31, 1894. No. 1: 113-136; no. 2: 137-168; no. 3: 169-184; no. 4: 185-200; no. 5: 201-224; no. 6: 225-256; no. 7: 257-274, issued as follows: no. 1: Jan. 31,

1895, no. 2: Feb. 28, 1895, no. 3: Mar. 28, 1895, no. 4: Apr. 30, 1895, no. 5: May 31, 1895, no. 6: Sept. 30, 1895, no. 7: Oct. 31, 1895. The new species were described in Part I, 1895 and date from Jan. 31. They were described on the following pages *L. bogdanowi* n.sp. p. 115–118, *L. pinihabitans* n.sp. 118–119, *L. nudus* DeGeer p. 119–124, *L. pineus* mihi=*L. pineti* Koch, p. 126–130, *L. flavus* n.sp. 133–134, *L. juniperinus* n.sp. p. 134–136. *L. pichtae* n.sp. was not described except in the key on page 104 of part nine issued in 1894 and hence should carry that date. All species now belong in the genus *Cinura*. The copy of this paper in the Library of the British Museum of Natural History, which appears to be a reprint, has the text continuous from start to finish, with no indications of divisions into parts and with no reference to dates other than on the title page, 1894 –go doda. “(i.e. of the year 1894.)” and the publishers name and date 1894-95. This copy also has the title page “Raboty iz laboratorii Zoologicheskago Kabineta Imperatorskago Warshawskago Universiteta.” Thus we seem to have evidence that the paper was printed twice, once in Izviestii, and once in the Raboty series, a series which to some extent might be called parasitical. As printed in Izviestii and in Raboty the pages were numbered the same. Mordvilko appears to have published other of his papers twice; I know of several such, but in these the pages are not the same.

LITERATURE CITED

BÖRNER, CARL

1930. Beiträge zu einem neuen System der Blattläuse. Archiv für klassifikatorische und phylogenetische Entomologie, Band I Heft 2. pp. 175, 178, 189.

BÖRNER, CARL & SCHILDER F. A.

1932. Sonderabdruck aus Sorauers Handbuch der Pflanzenkrankheiten, vol. V. Zweiter Teil, p. 612.

COCKERELL, T. D. A.

1902. A new plant-louse from Southern California. Bul. Southern California Acad. Sci. 1(4):40. [Not Bul. 8, California Acad. Sci. 1:40, as given in Patch, 1938:273.—Ed.]

DAVIDSON, W. M.

1909. Notes on the Aphididae collected in the vicinity of Stanford University. Journal of Economic Entomology, vol. 2, p. 304.
1914. Plant-louse notes from California. Journal of Economic Entomology, vol. 7, p. 133.

DICKSON, R. C.

1940. A new Pergandeida from the Colorado Desert. The Pan-Pacific Entomologist, vol. XVI, No. 2, pp 57–58.

HARTIG, Th.

1841. Versuch einer Eintheilung der Pflanzenläuse (Phytophires Burm.) nach der Flügelbildung. Zeitschrift für die Entomologie. Dritter Band, Erstes und zweites Heft. pp. 366, 367, 368, 369.

HOTTES, F. C.

1930. Aphid homonyms. Proceedings of the Biological Society of Washington, vol. 43, p. 184.

HOTTES, F. C. & WEHRLE, L. P.

1951. Arizona Aphididae. Proceedings of the Biological Society of Washington, vol. 64, pp. 49-50.

JUDENKO, EUGENJUSZ

1930. Data concerning the fauna and the biology of plant lice from the surroundings of Pulawy. Bul. Entom. de la Pologne, vol. 9 (3-4) pp. 146-148 and p. 183.

KIRKALDY, G. W.

1904. Bibliographical and nomenclatorial notes on the Hemiptera. Entomologist, vol. 37 p. 279. (Not seen.)

1905. Catalogue of the genera of the Hemipterous Family Aphidae, with their typical species together with a list of the species described as new from 1885 to 1905. The Canadian Entomologist, vol. 37, p. 416. (*hyadaphis*, n. n. indicated as type for genus *Hyadaphis*.)

KOCH, C. L.

1855. Die Pflanzeläuse Aphiden, pp. 137-139. pp. 199, 230.

LAMBERS, D. HILLE RIS

1931. A list of the Aphididae of Venezia Tridentina. Part Two. Mem. Mus. Stor., Nat. Venezia Tridentina, vol. I, pp. 40-41. (Not seen.)

1934. Notes on Theobald's "The Plantlice or Aphididae of Great Britain," vol. II & III. Stylops, vol. 3, part 2, p. 26.

1947. Contributions to a monograph of the Aphididae of Europe. Reprint from Temminckia, vol. VII. p. 255.

MORDVILKO, A. K.

1895. Zur Biologie und Systematik der Baumläuse (Lachinae Pass. partim) des Weichselgebietes. Zoologischer Anzeiger, vol. XVIII No. 469 and No. 470. pp. 74, 96-103.

- 1894-1895. K faunie i anatomii sem'(i) Aphididae Privislinskago karia. (Iz Laboratorii Zoologicheskago Kabineta Varshav-[skago] Universiteta). In Warsaw. Universitet Izvestiia. pp. 115-136. (Not seen.)

- 7 1914. Insects Hemipteres Vol. I. Faune de la Russie, p. 71. addendum of same, p. 3.

- | 1928. The evolution of cycles and the origin of heteroecy (migrations) in plant-lice. Annals and Magazine of Natural History, ser. 10, vol. II, p. 570.

- | 1929. Food Plant Catalogue of the Aphididae of U.S.S.R. pp. 34, 40, 55, 57, 79, 91.

NEAVE, SHEFFIELD AIREY

1940. Nomenclator Zoologicus, vol. III.

1950. Nomenclator Zoologicus, vol. V.

NEVSKY, W. P.

1929. The plant lice of Middle Asia III. Zoologischer Anzeiger, vol. 82, p. 197.

PASSERINI, G.

1857. Gli Afidi. (Photo copy from Dr. Hans Sachtleben, Berlin, Germany). Estratto dal giornale i Giar dini, fasc. XII, giugno, pp. 1-20.
1860. Gli Afidi Con Un Prospetto Dei Generi Ed Alcune Specie Nuove Italiane, pp. 1-40.

PATCH, E. M.

1938. Food-plant catalogue of the Aphids of the World, including the Phylloxeridae. University of Maine, Maine Agric. Expt. Sta., Bul. 393, pp. 35-421.

SCHRANK, FRANZ VON PAULA

1801. Fauna Boica. Zweiter Band, p. 107.

THEOBALD, F. V.

1925. New and little-known aphides. Ent. Mo. Mag. 61, p. 75.
1926. The Plant Lice or Aphididae of Great Britain, vol. I. p. 186.
1929. The Plant Lice or Aphididae of Great Britain, vol. III, p. 145.

R CUTEREBRA LATIFRONS REARED FROM NEOTOMA
FUSCIPES MACROTIS
(Diptera: Cuterebridae)

RAYMOND E. RYCKMAN

Department of Entomology, School of Tropical and Preventive Medicine,
Loma Linda, California

On April 16, 1952, a young wood rat, *Neotoma fuscipes macrotis* Thomas, was captured and brought to the laboratory alive. The collection was made in San Timoteo Canyon, Riverside County, California at a point eleven miles southeast of Redlands. When captured, the young rat was found to be parasitized by four warbles. Three were located on the ventral aspect of the neck and shoulders, one on the postero-superior aspect of the hind leg. The animal was reared, as described below. Three larvae pupated April 27, 29 and 30. On April 30 the animal was anesthetized and the fourth warble excised; this specimen was preserved in 75% alcohol. Adult cuterebrids emerged as follows: one male on June 3, the two females on August 15 and September 5.

Rearing Technique—Immediately after capture, the young rat was placed in an Army Medical School Model rat cage (fig. 1). The bottom tray was covered with moist sand to a depth of one inch. As the larvae matured and left the animal, they fell through

RAT CAGE
(ARMY MEDICAL SCHOOL MODEL)

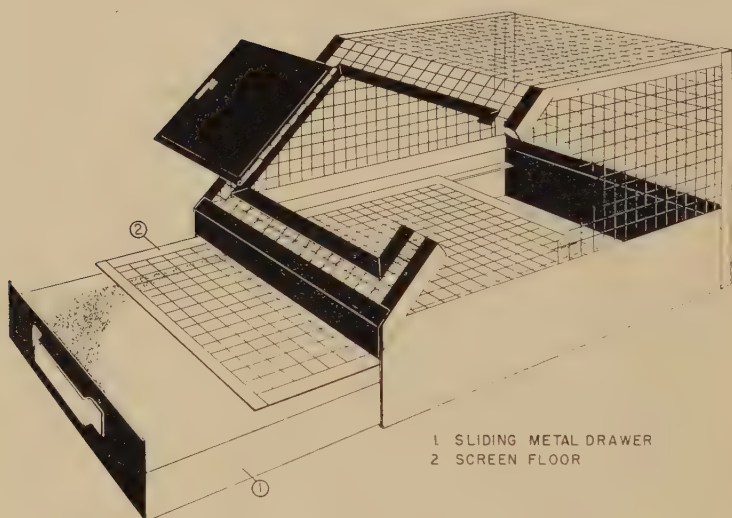


Fig. 1. Type of rat cage used in obtaining puparia of *Cuterebra*.

the coarse screen grating into the sand and pupated. Wood rats are insectivorous and it is important to protect the larvae from the rats.

Pupae recovered from the sand were placed in pint jars containing two inches of slightly moistened sand. The mouths of the jars were covered with muslin in order to retain the flies. After emergence each fly was pinned with its puparium.

The author has found, as did Beamer, Penner and Hibbard (1943), that wounds produced by warbles heal quickly and with little disturbance to the host rat.

The reared specimens have been deposited in the U.S. National Museum, where they were identified by C. W. Sabrosky as *C. latifrons* Coquillett. In a personal communication, he states that "This is the first we have and the first we know of associated with the puparium."

LITERATURE CITED

BEAMER, R. H., PENNER, L. R. and HIBBARD, C. W.

1943. Some notes on the biology of the pack rat cuterebrid (Cuterebrid [sic!] beameri Hall) in Kansas. Journal of the Kansas Entomological Society, 16 (2): 47-50, incl. 1 pl.

ADDITIONS AND CORRECTIONS TO "THE WASPS OF THE
GENUS SOLIERELLA IN CALIFORNIA"

(Hymenoptera: Sphecidae, Larrinae)

FRANCIS X. WILLIAMS

*Research Associate, Department of Entomology,
California Academy of Sciences*

Since the publication of my paper on the genus *Solierella* in California (1950. Proceedings of the California Academy of Sciences 26 [11]:335-417) more material has come to hand which necessitates a few changes and some additions. These notes are based on a collection made chiefly by the California Insect Survey, Department of Entomology and Parasitology, University of California, mostly in 1948 and 1949, and on specimens collected by me in the summer of 1950 while a guest at the California Insect Survey Camp in the San Gabriel Mountains, Southern California. Thanks are extended to the above Institution and to Drs. J. W. MacSwain and P. D. Hurd who made the collection available to me.

1. SOLIERELLA BOHARTI Williams

Solierella boharti Williams, 1950. Proc. Calif. Acad. Sci. 26(11):366.*Solierella lasseni* Williams, loc. cit.:366-367. **New synonymy.**

Three females from Echo Lake, El Dorado County, July 21, 1949 (P. D. Hurd): 2 ♀, Buck's Lake, Plumas County, July 14, 1949 (P. D. Hurd), and August 9, 1949 (J. W. MacSwain) 4 ♂ and 4 ♀, Tanbark Flat, San Gabriel Mts., Los Angeles Co., 2700 feet elevation, June, July, 1950; 4 ♂, Crystal Lake, San Gabriel Mts., 6000 ft. (F. X. Williams). One of the females from Echo Lake is entirely black, the remaining females have the abdomen red. My *Solierella lasseni* is only a color phase of *S. boharti*. All the males are black. This species varies in length from about 4 mm. in the male to 8.75 in the largest female.

2. SOLIERELLA SONORAE Williams

(Figures 1-3, 7)

Solierella sonora Williams, 1950. Proc. Calif. Acad. Sci., 26(11):368.

Four females, Palo Verde, Imperial County, collected as follows: 1 ♀ March 7, 1947 (E. G. Linsley); 3 ♀ April 8, 1949 (P. D. Hurd); 1 ♀, Borego, San Diego County, April 5, 1949 (P. D. Hurd); 1 ♀, Cottonwood Springs, Riverside County, April 26, 1949 (J. E. Gillaspay), and 1 ♂, Yaqui Well, San Diego County, April 25, 1949 (L. W. Quate).

The largest female is 9 mm. long, and all have the disc of the propodeum mainly finely granulate and with a delicate median carina. The single male is 6 mm. long, and also has the abdomen reddish; the tarsi are pale brown and there is a dorsal creamy yellow stripe on the posterior tibiae, while the apex of the fore trochanters is pale yellow. The clypeus has the lateral teeth incurved; the frontal V is long, rather sharply margined, and constricted above; the antennae are moderately stout—much as in the common *S. striatipes*—with segment 3 widening distally (fig. 7). The extension of the last visible ventral segment is long and slender; the lobe of the aedeagus with a curved point—as in *S. boharti*, and *S. fossor* (Rohwer). The vestiture is all silvery.

3. SOLIERELLA MAJOR (Rohwer)

(Figures 6, 8)

Silaon major Rohwer, 1917. Proc. U. S. Nat. Mus., 53:247–248.

One female and 4 males, Crystal Lake, San Gabriel Mts., Los Angeles County, elev. 6000 ft., June 29, 1950 (F. X. Williams)
Taken beneath a honey-dewed shrub.

The female is 8.75 mm. long and differs from the type (described from North Yakima, Washington) in having the third pair of legs red. The frontal V is not constricted above. It differs from *S. striatipes* in lacking the low lateral clypeal tooth and in having a well developed tarsal comb. The males average 6.5 mm. long; they are black with the head and thorax subopaque and with strong close punctures. The abdomen is more finely punctate. The tarsi are chiefly pale reddish-brown; the hind tibiae with a creamy white stripe above; venation dark; abdomen red. Clypeus strongly carinate, the produced portion truncate, with a shining median lobe that widens as viewed from in front, the lateral angles are rounded; frontal carina running into the open apex of the frontal V which is shallow, heavily rimmed and subtending an angle of somewhat less than 90 degrees, converging above, the greatest width of the V being about twice the distance between one of its edges and the compound eye on that side; upper U slightly indicated; ocelli in nearly an equilateral triangle; a smooth area between each posterior ocellus and the compound eye. Antennae more slender than in *S. sonorae* and *S. striatipes*, the third segment rather slender, not expanding much distally, its length at least $2\frac{1}{2}$ times the apical diameter (Fig. 8). Disc of propodeum with a median carina and strong oblique carinae, the posterior face with a narrow V-like groove and transverse carinae. Second submarginal cell receiving both recurrent veins. Last visible ventral segment with the extension tapering from a broad base and a little shorter than in *S. sonorae*; aedeagus nearest to *S. striatipes*, terminating in profile as a rounded club, curved at nearly right angles. Vestiture, of silvery pile.

In one male specimen the carinulae of the disc of the propodeum are arranged in more or less concentric fashion (as some-

times occurs in *S. striatipes*). Since the female specimen is not typical, having the posterior legs red, the male herein described may differ from that which may eventually be taken in the type locality. The males from the San Gabriel Mountains differ from both *S. striatipes* and *S. sonorae* slightly in the clypeal outline, in the more slender antennal segments, the somewhat blunter frontal V, and slightly in the last visible ventral segment and aedeagus.

I am indebted to Dr. Karl V. Krombein, of the United States National Museum for comparing the female *Solierella major* from the San Gabriel Mountains, with the type.

4. SOLIERELLA STRIATIPES (Ashmead)

Niteliopsis striatipes Ashmead, 1899. Ent. News, 10(1):9.

One male, Tracy, San Joaquin County, July, 1946 (E. G. Linsley).

Males of this species seem rarely to have the facial pile silvery instead of pale brassy.

5. SOLIERELLA VIERECKI (Rohwer)

Niteliopsis vierecki Rohwer, 1909. Trans. Amer. Ent. Soc., 35(1):112.

One male, White Water Canyon, Riverside County, April 2, 1948 (J. W. MacSwain); 1 ♀, Mt. Palomar, San Diego County, 4000 ft. elevation, June 19, 1950 (F. X. Williams).

Both specimens of this wide-fronted species are in fine condition. The clypeus of the male has a rather narrow median wedge and the fore trochanters are feebly excavate basally.

This wasp appears to be rare in California.

6. SOLIERELLA SIMILIS (Bridwell)

Silaon similis Bridwell, 1920. Proc. Hawaiian Ent. Soc., 4(2):402-403.

One female, Carrville, Trinity County, 2400-2500 feet, June 18, 1934 (T. Aitken); 1♀, Quincy, 4 mi. W., Plumas County, July 2, 1949 (J. W. MacSwain); 2♀, Buck's Lake, Plumas County, July 14, 1949; 1 ♂, Tanbark Flat, San Gabriel Mts., June 25, 1950 (F. X. Williams).

7. SOLIERELLA VANDYKEI Williams

Solierella vandykei Williams, 1950. Proc. Calif. Acad. Sci., 26(11):371.

One female, China Flat, El Dorado County, June 28, 1948 (J. W. MacSwain).

The dorsulum is more shining and more delicately punctate than in *S. similis*, its relative. Clypeus with a steep preapical break.

Thus far an uncommon species. Male unknown.

8. *SOLIERELLA CORIZI* Williams

Solierella corizi Williams, 1950. Proc. Calif. Acad. Sci., 26(11):372-373.

Four females, Tracy, San Joaquin County, summer of 1949 (J. W. MacSwain, Ray F. Smith); 1 ♂, Quincy, 4 m. W. Plumas County, July 16, 1949; 1 ♀, Bridge Creek Camp, Lassen County, August 9, 1949 (J. W. MacSwain). These are typical large specimens that show no postocellar convexities. A female from Blythe, Riverside County, has a pair of postocellar tubercles. Specimens from Llano County, Texas, may or may not have these tubercles, and they show other variations among themselves.

9. *SOLIERELLA INERMIS* (Cresson)

Nysson inermis Cresson, 1872. Trans. Amer. Ent. Soc., 4(3):224.

What I take to be this species is represented by one male and one female from Llana County, Texas, June 12, 1941 (J. E. Gilaspys). They much resemble those that I have studied from western Kansas, and except slight differences in clypeal outline and in aedeagus suggest small *Solierella corizi*. The *Solierella* of the *inermis*, *mirifica* Pate, and *corizi* group need study in larger series.

10. *SOLIERELLA BLAISDELLI* (Bridwell)

Silaon blaisdelli Bridwell, 1920. Proc. Hawaiian Ent. Soc., 4(2):401.

One female, Amedee, Lassen County, July 4, 1947 (J. W. MacSwain).

11. *SOLIERELLA PECKHAMI* (Ashmead)

Dr. Karl V. Krombein 1951, in "Hymenoptera of North America North of Mexico—Synoptic Catalog," U. S. Dept. Agr., Monogr. 2:943, gives the synonym of this widely distributed species as follows:

Plenoculus peckhami Ashmead, 1897. Psyche, 8:130. ♂.

Plenoculus niger Ashmead, 1899. Psyche, 8:339 ♀. N. syn.

Silaon rohweri Bridwell, 1920. Hawaiian Ent. Soc. Proc., 4:398. N. syn.

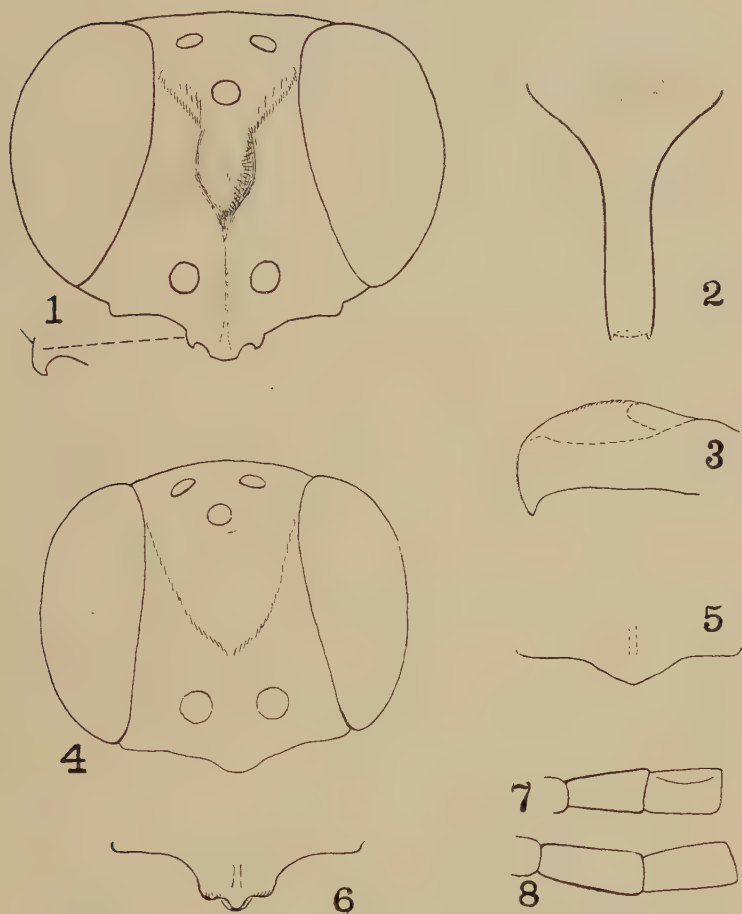
Solierella (Silaon) arenaria Krombein, 1939. Brooklyn Ent. Soc. Bul. 34: 139 ♀. N. syn.

Two males, Tanbark Flat, San Gabriel Mts., summer of 1950 (F. X. Williams).

12. *SOLIERELLA CLYPEATA* Williams

Solierella clypeata Williams, 1950. Proc. Calif. Acad. Sci., 26(11):376-378.

One female, Tanbark Flat, San Gabriel Mts., summer of 1950 (F. X. Williams).



EXPLANATION OF FIGURES

Fig. 1. *Solierella sonoreae* Williams. Male. From Yaqui Well, San Diego County. Fig. 2. Same. Last visible ventral segment. Same data. Fig. 3. Same. Male aedeagal lobe. Same data. Fig. 4. *Solierella affinis* (Rohwer). Female. Bridge Creek Canyon Camp, Lassen County. Fig. 5. Same. Clypeal outline of another specimen. Same data. Fig. 6. *Solierella major* (Rohwer). Male. Clypeus, San Gabriel Mts. Fig. 7. *Solierella sonoreae* Williams. Antennal segments 3 and 4 from within. Yaqui Well, San Diego County. Fig. 8. *Solierella major* (Rohwer). Male. Antennal segments 3 and 4 from within. San Gabriel Mts.

13. *SOLIERELLA AUSTRALIS* Williams

Solierella australis Williams, 1950. Proc. Calif. Acad. Sci., 26(11):379-380.

Five females and 1 male, Tanbark Flat, San Gabriel Mts., June-July, 1950; 1 ♀, Mt. Palomar, San Diego County, June 19, 1950 (F. X. Williams).

14. *SOLIERELLA AFFINIS* (Rohwer)

(Figures 4, 5)

Niteliopsis affinis Rohwer, 1909. Trans. Am. Ent. Soc., 35(1):113-114.

What I regard as this species is represented by 6 females, as follows: 1 ♀, Quincy, 4 mi. W., Plumas County, July 3, 1949 (J. E. Gillaspay); 2 ♀, Buck's Lake, Plumas County, July 14, 1949 (P. D. Hurd); 2 ♀, Bridge Creek Camp, Lassen County, July 9, 1949 (J. W. MacSwain); 1 ♀, Lassen Peak, 7500 ft., July 18, 1949 (J. W. MacSwain).

These are large specimens; the type described from Colorado is 4.25 mm. long. The 6 specimens measure 5.5, 5.4, 5.1, 5.1, 5.0 and 4.30 mm. respectively. The mandibles are creamy white basally. The clypeal outline varies somewhat, as figured, being intermediate between *S. peckhami* and *S. arcuata*; in *S. arcuata* the clypeus is more broadly and evenly arched and is reddish apically. The slightly troughed disc of the propodeum has a median carina but no enclosing one, the latter being present in *S. blaisdelli* and *S. peckhami*; sides of the propodeum with rather numerous oblique carinulae. Pygidial area with fine deep punctures. There is a tendency for the second submarginal cell to receive both recurrent veins.

I have been unable to discover the male of *Solierella affinis*.

15. *SOLIERELLA ALBIPES* (Ashmead)

Plenoculus albipes Ashmead, 1899. Psyche, 8(275):338-339.

One ♀, Amedee, Lassen County, July 4, 1947 (T. F. Leigh); 1 ♀, Tracy, San Joaquin County, May 31, 1949 (J. W. MacSwain).

CORRIGENDA: My reference, "*Solierella albipes* (Ashmead) Krombein, 1938, An. Ent. Soc. Amer., 31:469" in Proc. Calif. Acad. Sci., 26(11):385 (1950), should be deleted.

16. *SOLIERELLA SAYI* (Rohwer)

Niteliopsis sayi Rohwer, 1909. Trans. Am. Ent. Soc., 35(1):114-115.

Two ♀, Quincy, 4 m. W., Plumas County, June 30 and July 3, 1949 (P. D. Hurd); 1 ♀, Hills backs of Oakland, July 20, 1949 (J. E. Gillaspay); 2 ♀ and 7 ♂, Tanbark Flat, San Gabriel Mts., summer of 1950 (F. X. Williams).

INSECTS REARED FROM CACTI IN ARIZONA

(Dermaptera, Coleoptera, Diptera)

RAYMOND E. RYCKMAN AND CHARLES T. AMES

*Department of Entomology, School of Tropical and Preventive Medicine,
Loma Linda, California*

Decomposing cacti have been found to be a very prolific breeding habitat for many insects. It is the opinion of the authors that cacti are ecological oases for many insects.

On April 13, 1952, a fallen and decomposing *Cereus gigantea* Engelmann was examined. Syrphid larvae were so numerous that when this cactus was disturbed, movement of the larvae was audible at a distance of three feet. It was possible to scoop up handfuls of the maggots.

In the following list the initials in brackets are those of the persons who identified the insects, i.e., A. B. Gurney (A.B.G.), C. W. Sabrosky (C.W.S.), H. B. Leech (H.B.L.), M. W. Sanderson (M.W.S.), O. L. Cartwright (O.L.C.), R. E. Blackwelder (R.E.B.), W. W. Wirth (W.W.W.).

SPECIES REARED FROM *Opuntia basilaris* Engelmann

DIPTERA

Syrphidae

Volucella esuriens (Fabricius), (W.W.W.). Tucson, Ariz., December 27, 1952.SPECIES REARED FROM *Cereus gigantea* Engelmann

DIPTERA

Lonchaeidae

Lonchaea striatifrons Malloch. (C.W.S.). 7 miles west of Wickenburg, Ariz., December 26, 1951.

Milichiidae

Desmometopa sp. (? *tarsalis* Loew), (C.W.S.). 7 miles west of Wickenburg, Ariz., December 26, 1951.

Sphaeroceridae

Leptocera sp. (? *approximata* Malloch). (C.W.S.). Quartsite, Ariz., November 28, 1950.

Syrphidae

Volucella isabellina Williston. (W.W.W.) 7 miles west of Wickenburg, Ariz., December 26, 1951, and April 13, 1952.*Volucella apicifera* Townsend. (W.W.W.). 7 miles west of Wickenburg, Ariz., April 13, 1951.

Drosophilidae

Drosophila sp., larva. (W.W.W.). 7 miles west of Wickenburg, Ariz., December 26, 1951.

Heleidae

Dasyhelea mutabilis (Coquillett). (W.W.W.). Quartsite, Ariz., November 28, 1950.

Culicoides copiosus Root and Hoffman. (W.W.W.). 7 miles west of Wickenburg, Ariz., December 26, 1951.

DERMAPTERA**Labiidae**

Spongovostox apicedentatus (Caudell). (A.B.G.). 7 miles west of Wickenburg, Ariz., April 13, 1952.

COLEOPTERA**Staphylinidae**

Belonuchus sp. near *punctiventris* Casey. (H.B.L., & M.W.S.). Quartsite, Ariz., November 28, 1950.

Aleochara ponderosa Casey. (R.E.B.) 7 miles west of Wickenburg, Ariz., April 13, 1952.

Xanthopygus cacti Horn. (R.E.B.). 7 miles west of Wickenburg, Ariz., April 13, 1952.

Stilpnedon sp. (R.E.B.). 7 miles west of Wickenburg, Ariz., April 13, 1952.

Physetoporus grossulus (LeConte). (R.E.B.). 7 miles west of Wickenburg, Ariz., April 13, 1952.

Histeridae

Hololepta (Leionota) yucateca Marseuil. (O.L.C.). 7 miles west of Wickenburg, Ariz., April 13, 1952.

Hololepta sp. (O.L.C.). 7 miles west of Wickenburg, Ariz., April 13, 1952.

Carcinops sp. (O.L.C.). 7 miles west of Wickenburg, Ariz., April 13, 1952.

Tenebrionidae

Cynaesus angustus (LeConte). (R.E.B.). 7 miles west of Wickenburg, Ariz., April 13, 1952.

The authors believe that the insects mentioned above frequently depend on cacti as an ecological niche in which to breed. No attempt has been made to include incidental insect visitants to cacti or such common phytophagous species as *Chelinidea tabulata* Burmeister.

The authors are indebted to the taxonomists mentioned above, for identification as indicated. Representative specimens have been retained by these specialists in the U. S. National Museum, California Academy of Sciences, and the Illinois Natural History Survey.

A NEW GENUS OF LIMNEPHILIDAE

(Trichoptera)

D. G. DENNING

1684 Oak Park, Walnut Creek, Calif.

Recent collections of caddisflies sent to the writer have contained several interesting new species of Limnephilidae. Herein is described a new genus, remarkably different from others in the family, together with four new species. All are in genera which are rather rare in collections and are very poorly known. All localities are from the western montane region. Unless otherwise designated types of the new species are in the author's collection.

Rossiana Denning, new genus

This genus is remarkably distinctive from other described genera, in several respects it bears little resemblance to any other Limnephilid genus. Of the described genera it is probably nearest *Lepania* Ross, but differs greatly from that genus and others in many wing venational characters, in the very peculiar maxillary palpus and the genitalia.

Characteristics. General structure as for family. Head wide, ocelli prominent; postero-lateral wart elongate, slender, anterior warts small, circular, forming a triangle with median ocellus. First and second segment of labial palpi wide, flattened, ventral surface concave. Maxillary palpus (one present on specimen), with basal segment long, almost twice as long as second and third combined; a shallow elongate excavation occupies distal portion of basal segment, arising from near proximal end of cavity are the second and third segments, directed outwards at nearly right angles to basal segments, second segment slightly longer than third, fig. 1B. (Antennae, first pair of legs and one of second pair of legs missing from holotype of type species). Spur count on second and third pair of legs: 4-4; no spines present on last tarsal segment of hind leg. Fore wing, fig. 1A, practically same width throughout, anterior margin broadly rounded: stigma indistinct; oblique crossvein between Sc and margin; distally R_1 sinuate and almost touching distal part of Sc, fork R_{2+3} considerably basad fork R_{4+5} , R_2 arising about midway discal cell, fork R_{4+5} arises beyond discal cell, discal cell narrow, short, shorter than pedicel; fork M_{1+2} considerably before crossvein r-m. Hind wing not excised, costal margin without hamuli; R_2 arises about midway discal cell which is closed and shorter than pedicel, M_{1+2} divided, stem of M atrophied, most of Cu_2 atrophied.

It is with pleasure that I name this new genus in honor of Dr. H. H. Ross, Illinois Natural History Survey, Urbana, Illinois, who has made so many noteworthy contributions to our knowledge of the Trichoptera.

GENOTYPE, *Rossiana montana*, new species.

Rossiana montana Denning, new species

Male: Length 9.5 mm. General color blackish. Head and thorax blackish, wings uniformly dark brown, legs long, fulvous, spurs a trifle lighter in color.

Genitalia as in fig. 1. Ninth segment annular, dorsal and ventral portions narrowed, lateral portion considerably expanded, sternal margin projected caudad as a wide truncate strap, best seen from ventral aspect, fig. 1D; setation sparse. Tenth segment projects caudad slightly beyond basal segment of clasper, from lateral aspect appears somewhat flattened, narrow throughout, distal margin curved slightly dorsal; seen from dorsal aspect fig. 1C, cleft about midway, each lateral part truncate distally and only slightly divergent, mesal portion lightly sclerotized. Cerci, seen from lateral aspect, greatly constricted ventrally into a narrow finger-like process, quite closely appressed to each side of tenth tergite, and extending ventrad beyond it; when seen from dorsal aspect, fig. 1C, subtriangular. Clasper with basal segment massive, not much longer than broad, dorsal margin straight, ventral margin arcuate, ventral and distal margin bearing long fulvous setae, distal segment narrow, longer than basal segment, somewhat finger-like; seen from ventral aspect mesal margin of basal segment bears a short truncate mesad directed process, apical margin dentate; distal segment broadly curved mesad, ventral margin dentate, bearing minute setae. Aedeagus from ventral aspect, fig. 1E, short, not freely extensile, somewhat vasiform; arising from distal portion and projecting beyond distal margin is a dense mass of slender, acute, heavily sclerotized spines.

Holotype: Male. PASS CREEK, near summit of GIBBONS PASS. BITTERROOT NATIONAL FOREST, RAVALLI COUNTY, MONTANA, June 30, 1949. Elev. 6700 feet, (C. P. Alexander).

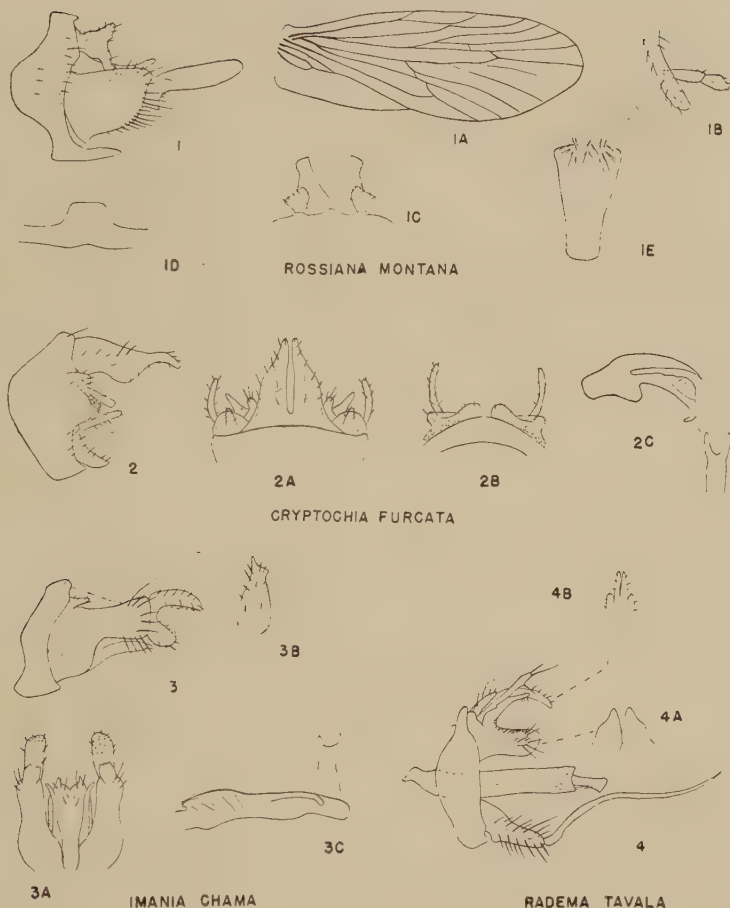
Dr. Alexander states that the collecting conditions were very definitely early spring. The above material was collected on the Montana side of the Continental Divide, which is about 15 miles west of the Big Hole Battlefield National Monument.

I would like to express my thanks to Dr. H. H. Ross who examined this specimen and who also expressed the opinion that it represented an undescribed genus and species.

Cryptochia furcata Denning, new species

In 1950 Ross erected a new genus, *Cryptochia*, to include a single species *C. pilosa* (Banks) which has been recorded from Washington, Oregon and Idaho. The present species, *furcata*, thus represents the second described species in the genus. On the basis of the tenth tergite, claspers, aedeagus and several other genitalic differences this species may readily be distinguished from *pilosa*.

Male: General characteristics essentially similar to those included in the generic characters as set forth by Ross. Length 8 mm. Head and thorax



EXPLANATION OF FIGURES

Fig. 1. *Rossiana montana*, male genitalia, lateral aspect; 1A, fore wing; 1B, maxillary palpus; 1C, cerci and tenth tergite, dorsal aspect; 1D, sternum of ninth segment, ventral aspect; 1E, aedeagus, ventral aspect. Fig. 2. *Cryptochia furcata*, male genitalia, lateral aspect; 2A, tenth tergite, dorsal aspect; 2B, claspers, ventral aspect; 2C, aedeagus, lateral aspect. Fig. 3. *Imania chama*, male genitalia, lateral aspect, 3A, claspers and tenth tergite, ventral aspect; 3B, left lateral lobe of tenth tergite, dorsal aspect; 3C, aedeagus, lateral aspect. Fig. 4. *Radema tavalala*, male genitalia, lateral aspect; 4A, ventral aspect of ventral process of tenth tergite structure; 4B, tenth tergite, dorsal aspect.

dark brown, antennae and wings brownish, legs fulvous. Venation very similar to that illustrated and described by Ross for *pilosa*. Eighth tergite bearing a number of rather long scattered setae.

Genitalia as in fig. 2. Ninth segment with tergum and sternum narrowed, lateral aspect considerably expanded. Tenth tergum reaching caudad beyond remainder, cleft nearly to base, fig. 2A; seen from lateral aspect ventral margin sinuate, apex greatly narrowed, directed slightly ventrad. Cerci small, ovate, lightly sclerotized. Arising from distal surface of segment, approximate to lateral margin of ninth segment there appears a heavily sclerotized structure as follows: (1) a large heavily sclerotized spine-like process, ventrad directed and acute apically, mesal surface extended mesad as a triangular caudad-directed plate; (2) a slender dorsal process, apically sub-acute and ventrad directed, apex with a few scattered setae. Claspers ventral in position, somewhat crescent-shaped, heavily sclerotized, projected caudad as a large broadly rounded process, best seen from ventral aspect, fig. 2B; dorsally clasper bears an apically blunt, lightly sclerotized filamentous process. Aedeagus, fig. 2C, consists of a dorsal pair of heavily sclerotized blades, apically acute and gradually curved ventrad; ventral portion consists of a rather massive heavily sclerotized blade, apically furcate, apex hamate, dorso-distal surface semi-membranous.

Holotype. Male. GLACIER NATIONAL PARK, MONTANA, Lake McDonald, Fish Lake Trail, July 3, 1949, (C. P. Alexander).

Paratype. Male. Selkirk Mts., Head of Sawmill Creek, West of Wycliffe, British Columbia. Elev. 6050 feet, July 22, 1950, (Hugh B. Leech). Deposited in the collection of the California Academy of Sciences, San Francisco, California.

Imania chama Denning, new species

This represents the seventh species in the genus described from the Nearctic region. Ross (1950) classified the species into four groups: *chama* belongs in the *tripunctata* group along with *tripunctata* Banks, *gnathos* Ross and *cascadis* Ross. On the basis of the male genitalia it can easily be distinguished from those species. The species is most closely related to *tripunctata* Banks, differing from it in the size and shape of the ventral style of the clasper, which, although variable in *tripunctata* is spine-like and not blade-like, the shape of the tenth tergite, the entirely different aedeagus and the absence of the apicodorsal lobe of the ninth tergite.

Male: Length 9 mm. Head, thorax, antennae blackish, femur dark brown, remainder of leg fulvous; wings dark brown except a narrow light spot along r-m, a larger white spot near fork of M and a light spot somewhat smaller where Anals join margin.

Genitalia as in fig. 3. Ninth segment narrow, annular, sternum wider than tergum. Tenth tergite divided into two lateral lobes, latero-apical margin produced into an acute apex when seen from dorsal aspect, fig. 3B,

from lateral aspect tergite appears rooflike. Cerci rather inconspicuous, leaflike from dorsal view. Clasper with basal segment massive, dorsal portion projected caudad at right angles to remainder, a dense cluster of long setae distally; dorsal ramus of apical segment ellipsoid from lateral aspect, from ventral aspect about same width throughout, black peglike teeth scattered irregularly on a trifle more than half the ventral surface, much more dense near apical margin; ventral ramus only slightly longer than broad, considerably narrower than width of dorsal ramus, only apical margin bearing a dense row of black peglike teeth; bladelike ventral style arising on meson from base of clasper, divergent and acuminate from ventral aspect, fig. 3A; broad, arcuate, apically subtruncate from lateral aspect. Aedeagus, fig. 3C, tubular, dorsal arms curved ventrad, apex truncate; from ventral aspect apex widely furcate.

Holotype: Male. ALBANY CO., WYOMING, Snowy Range Mts., outlet of Telephone Lake. Elev. 10,500 feet, July 29, 1950, (D. G. Denning).

Radema tavalala Denning, new species

This species bears closest resemblance to *R. incerta* (Banks), but can easily be separated from it by differences in the aedeagus, tenth tergite and apical segment of clasper.

Male: Length 7 mm. Head, thorax and antennae black, legs fuscous, wings brownish. Spurs 1-2-4.

Genitalia as in fig. 4. Ninth segment with dorsum greatly reduced, projecting cephalad from dorsal portion is a thin flap-like process. From lateral aspect tenth tergite consists of the following processes: (1) a dorsal pair of arcuate bladelike processes, (2) a pair of thin filamentous processes, slightly widened distally, (3) a ventral pair of large, ventrally concave processes, a heavily sclerotized lateral ridge may cause this process to appear divided, a cluster of rather long setae present at apex of this ridge; from dorsal aspect dorsal processes (1) are elongate, closely appressed, bearing a few minute laterad directed setae, lying alongside are a pair of thin processes which arise from the large ventral piece, fig. 4B; from ventral aspect large ventral process (3) appears triangular, with apices slightly divergent, fig. 4A. Cerci small, slender throughout, heavily sclerotized. Clasper with basal segment elongate, narrowed distally; apical segment long, rod-like, sinuate, sharply acuminate. Aedeagus long, tubular, bearing a pair of apically acute, fairly long, slender ventral arms.

Holotype. Male. Head of METOLIUS RIVER, OREGON, May 21, 1950, (Fender & Jewett).

LITERATURE CITED

ROSS, HERBERT H.

1950. Synoptic notes on some nearctic Limnephilid caddisflies (Trichoptera, Limnephilidae). American Midland Naturalist, 43(2):410-429, 22 figs.

NEW SPECIES OF *PODABRUS* FROM WESTERN
NORTH AMERICA

(Coleoptera: Cantharidae)

KENNETH M. FENDER

McMinnville, Oregon

Since my notes on the species of *Podabrus* of Oregon and Washington were published¹, I have been permitted the privilege of examining certain specimens that were before Fall at the time of his revision of the genus². It has been found that errors in my paper were present, due largely to the lack of type material, and to inadequacies of Dr. Fall's studies. His descriptions were sufficient at the time of his study but are now far outmoded because of the captures of species unknown to him, but closely resembling some of his species.

The specimens before me that were studied by Fall indicated by a black card on the pin, are from the Ralph Hopping collection and were kindly loaned by E. S. Ross and Hugh B. Leech of the California Academy of Sciences.

Indications are that several species of *Podabrus* are much more local in range than they were previously supposed to be. Others have a much greater range than heretofore known. A true understanding of the western representatives of the genus cannot be formed until adequate collections are made from poorly sampled or uncollected areas.

Following my grouping³, *Podabrus edmundsae* should be placed in Group I, *P. piceatus* and *P. ochocensis* in Group II, and *P. alexanderi* in Group III.

***Podabrus edmundsae* Fender, new species**

Shining, black; head rufotestaceous with front narrowly infusate apically, varying to black behind eyes; apical segment of palpi piceous, basal segments darker above; pronotum rufotestaceous with a quadrangular black spot medially on anterior margin, basal margin narrowly black, this black area sometimes extending up the sides, a small, rather obscure spot on inner side of each discal convexity; posterior sternites bordered with rufotestaceous, fifth and sixth with a triangular pale area medially on apical margin, that on sixth being larger, extending nearly to base of segment, seventh and eighth sternites brunneous to rufotestaceous. Pubescence cinereous, thick and depressed. Length 10.5 to 13 mm.

¹ Fender, K. M., 1945, Pan-Pacific Ent., 21 (2): 77-80.

² Fall, H. C., 1928, Entomologica Americana, (n. s.) 8 (2): 65-103.

³ Fender, K. M., 1949, Pan-Pacific Ent., 25 (1): 29-32.

Male: Head slightly wider than pronotum, finely sparsely punctured in front, coarsely punctured between eyes, becoming scabrose punctate on neck; eyes large and prominent; antennae slender, extending to apical third of elytra, third segment slightly longer than second, intermediate segments three and a half times as long as wide. Pronotum transverse, anterior angles rounded, sides arcuate, subparallel to hind angles which are angularly produced, explanate near anterior angles, rather strongly reflexed near hind angles; disc finely sparsely punctulate, a little more coarsely so anterior to convexities which are low and orbicular, median impressed line incomplete, not eroded. Elytra finely rugulose, more coarsely so apically. Body beneath finely, rather closely punctulate, seventh sternite with a large triangular somewhat membranous medial area; protibiae not modified; metacoxae with an apical process which is tipped by a tuft of pale setigerous hairs. All claws with a long acute tooth, causing them to appear broadly cleft.

Female: Similar to male; pronotal markings present but less pronounced, antennae extending to about middle of elytra, intermediate segments about three times as long as wide, fifth and sixth sternites, protibiae and metacoxae not modified.

Holotype, male, Station O, PEAVINE RIDGE, McMinnville, OREGON, June 19, 1948, K. M. Fender; *allotype*, female, McMinnville, Oregon, May 22, 1941; nine *paratypes* from the following Oregon localities, High Heaven, McMinnville; Amity; Marys Peak, Corvallis.

Podabrus edmundsae is very close to *P. conspiratus* Fall, from which it may readily be separated by the pronotal markings, those of *P. conspiratus* being confined to a large quadrangular dark spot medially on the anterior margin.

Fall placed his *P. conspiratus* as near and possibly a mere variety of *Podabrus comes* Leconte. He, however, had only the female from which to diagnose and realizing the weakness of female characters indicated that should the male protibiae be unmodified, *P. conspiratus* should be associated with *P. mexicanus* Gorham and *P. tenuis* Fall. The male of *P. conspiratus*, like that of *P. edmundsae*, does not have the protibiae modified. Both species are quite closely akin to *P. binotatus* Leconte as indicated by their genitalia. Like these two species *P. binotatus* has the pronotum ornamented, but with only a dark spot on each convexity, and the elytra are yellow.

It gives me great pleasure to dedicate this fine species to Dr. J. C. Dirks-Edmunds. Through her interest in ecology and general biology she has not only added new species to be described but is helping to increase the knowledge of species already known.

Podabrus piceatus Fender, new species

Feebly shining to opaque; head black with front flavous to apex which is infusate, palpi flavous with apical segment dark brownish, first two or three antennal segments pale beneath; pronotum rufotestaceous, with or without a median longitudinal black stripe which when present attains and usually expands along apical and basal margins, or these margins alone may be more or less widely black medially; elytra flavous with suture narrowly and apices widely infusate; body beneath black, apices of coxae and femora and bases of trochanters and tibiae pale, more widely so on front legs; male genitalia brownish orange. Pubescence aureous, fine, thick and suberect. Length 7 to 9 mm.

Male: Head wider than pronotum, finely sparsely punctured in front, more closely coarsely so behind the prominent eyes, becoming rugose-punctate on neck; antennae slender, extending to about middle of elytra, segments two to four progressively longer, intermediate segments about three times as long as wide. Pronotum as long as wide, anterior angles obliquely truncated, sides straight, converging slightly to prominent hind angles, basal margin feebly convex in outline, strongly sharply reflexed, sides explanate near anterior angles; discal convexities crescentic and strongly raised, each one half or less as wide as median concavity, median longitudinal impressed line short, extending from near base to middle of concavity, disc finely micro-reticulate, closely and moderately coarsely punctured. Elytra finely rugose-punctured basally, becoming coarsely so apically, costae feebly indicated. Body beneath finely closely punctured, with long, fine transverse rugae on sternites. All claws armed with a stout acute basal tooth.

Female: Similar to male; head as wide as pronotum, eyes smaller and less prominent, antennae extending to basal third of elytra, pronotal convexities less pronounced, median impressed line very short.

Holotype, male, and *allotype*, female, from Station 3, PEAVINE RIDGE, McMinnville, OREGON, June 9, 1948, collected by K. M. Fender; 62 *paratypes* from the following Oregon localities: McMinnville, Peavine Ridge (McMinnville), Baker Creek (McMinnville), Dayton, Dilley, Damascus, Pistol River (coll. Borys Malkin). Collection dates range from May 16 to June 10.

Podabrus piceatus is close to *Podabrus extricatus* Fall which is smaller (6 to 7 mm.), has the pronotum flavous with a narrow median dark stripe, more shining, less closely punctured, and the convexities nearly as wide as the median concavity and thus less sharply rounded; the pubescence of *P. extricatus* is coarser, longer and sparser. *Podabrus extricatus* was incorrectly cited from Oregon by me⁴, the proper species being *P. piceatus*. *P. extricatus* is not now known to occur outside California.

⁴ Fender, K. M., 1945, Pan-Pacific Ent., 21: 79.

A series of eight specimens of *Podabrus* was collected by Borys Malkin along the Pistol River, Curry County, Oregon. They are black with small red spots at the anterior angles of the pronotum; the bases of the antennae and sides of the head beneath the antennae are pale. Another series, without the red pronotal spots except in an occasional female, has been collected at Crater Lake, Wallowa Lake, Bear Springs (Wapinitia Hgwy.), Mottet Ranger Station (Blue Mts.) and Takakkaw Falls, Oregon, and Yoho National Park, British Columbia (C. P. Alexander). No external character has been found to separate this latter series from *Podabrus piniphilus* Eschscholtz. By the conformation of the male genitalia, both the above series show a much closer affinity with *P. piceatus* (fig. 1) and *P. extricatus* than with *P. piniphilus* (fig. 2). They may prove to be but extremes of a variable species. Cleared genitalia may be required to verify the relationship.

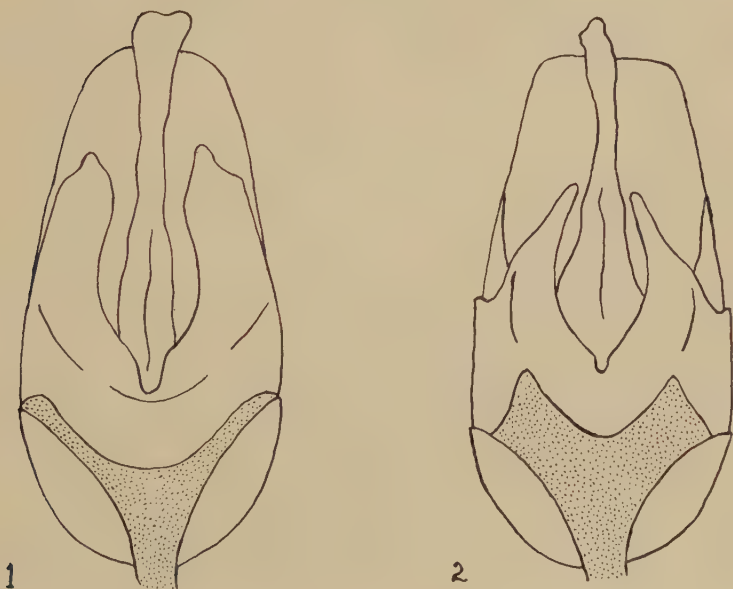


Fig. 1. *Podabrus piceatus* n. sp., male genital armature, ventral view.
Fig. 2. *Podabrus piniphilus* Eschscholtz, male genital armature, ventral view.

Podabrus ochocensis Fender, new species

Opaque, black; head in front of eyes pale, varying to sides of front pale; basal two or three antennal segments pale beneath; explanate sides of pronotum flavous, pale areas sometimes connected near anterior margins; anterior tibiae and tarsi sometimes brunneous; apical margins of abdominal sternites narrowly pale. Pubescence cinereous, fine, thick and depressed to suberect. Length 6 to 7.5 mm.

Male: Head wider than pronotum, coarsely closely punctured behind antennae, more closely so on neck, finely sparsely punctured in front; eyes large and prominent; antennae slender, extending to the middle of elytra, second segment about two-thirds length of third, third evidently shorter than fourth, intermediate segments about three times as long as wide. Pronotum one-eighth wider than long, anterior angles oblique, sides parallel to middle, concavely narrowing to hind angles which are acute, sides rather widely explanate, becoming strongly reflexed at hind angles; disc coarsely closely punctured, becoming less coarsely so on explanate sides, median concavity deep and so closely punctured that punctures are difficult to distinguish, similarly punctured on the anterior third; a longitudinal impressed line is obliterated except for a short distance between convexities. Elytra finely rugose-punctate, with two faint discal costae. Body beneath finely rather closely punctured, pubescence short and depressed; all claws armed with a stout basal tooth, those on the middle and hind legs short but less than right angles; those on front legs more acute, free angle extending nearly as far as the claw proper.

Female: Similar to male; head slightly narrower than pronotum, eyes smaller and less prominent; antennae extending to basal fourth of elytra, intermediate segments about two and a half times as long as wide. Pronotum less strongly explanate at sides, sides feebly sinuate, narrowing slightly from oblique anterior angles to hind angles which are feebly prominent.

Holotype, male, *allotype*, female, and nine *paratypes*, from OCHOCO CREEK, OCHOCO NATIONAL FOREST, OREGON, June 14, 1941, collected by D. McKey-Fender and K. M. Fender.

This species runs to *Podabrus scaber* Leconte in Fall's key. It fits still more closely Fall's description of *P. scaber*, his key being in error where he states the pronotum is black with a lateral red spot. Actually the species has the thorax black with the sides quite widely reddish yellow. In *P. scaber* the pronotal convexities are low and flattened on top, the median concavity is shallow, this disc is quite evenly coarsely punctured, the elytra being strongly coarsely rugose-punctate.

Podabrus alexanderi Fender, new species

Feebly shining, black; sides of the front, mandibles, all but apical segments of palpi and basal two or three antennal segments beneath, rufotestaceous; in males, front more or less widely brownish along margin, and a feeble pale spot at sides and near anterior angles of pronotum; apical segments of palpi brownish; apices of all coxae and femora narrowly pale, a little more widely so on coxae. Pubescence cinereous, short, suberect and inconspicuous. Length 8.5 to 9 mm.

Male: Head slightly wider than pronotum, opaque, closely rather coarsely punctured behind antennae, front shining and finely sparsely punctate; eyes prominent and rather coarsely faceted; antennae slender extending to middle of elytra, third segment twice as long as second, intermediate segments about three times as long as wide. Pronotum small, transverse, about one-fourth wider than long, anterior angles obliquely truncated, sides straight, converging slightly to hind angles which are acute; disc opaque, finely rather sparsely punctured, becoming rugulose on anterior third, convexities widely separated, median longitudinal line slightly raised or absent, a deep submarginal sulcus present along basal margin. Elytra closely rugose-punctate, discal costae feeble. Body beneath finely punctured, a little more closely so on abdomen. All claws finely cleft.

Female: Similar to male; front pale on each side beneath antennae; head slightly narrower than pronotum, eyes smaller and less prominent, antennae extending to basal third of elytra, intermediate segments about two and a half times as long as wide. Pronotum transverse, sides parallel from obliquely truncated anterior angles to prominent basal angles. All claws toothed at base.

Holotype, male, *allotype*, female, and eleven *paratypes*, from SUNWAPTA PASS, BANFF NATIONAL PARK, ALBERTA, July 21–26, 1949, collected by C. P. Alexander.

This species is related to *Podabrus fissilis* Fall. In that species, the head in front of the antennae is rufotestaceous, the pronotum of the male is nearly as long as wide and the sides are sinuate. The male genitalia are decidedly different; in *P. fissilis* the apical margin of the dorsal plate of the tegmen is very shallowly, widely emarginate, while in *P. alexanderi* it is deeply, less widely so.

It is a great pleasure to dedicate this species to Dr. C. P. Alexander, in gratitude for his interest in my studies as well as for his many fine additions to my collection.

A NEW SUBSPECIES OF TRACHYKELE BLONDELI

(Coleoptera: Buprestidae)

JACQUES R. HELFER

Mendocino, California

Trachykele blondeli cupreomarginata Helfer, n. subsp.

Structurally and chromatically nearly like typical *T. blondeli* but differing from it in having the elytra laterally margined with cupreous color, smooth median line of pronotum and usually entire central portion of pronotum cupreous, black elytral markings paired and more distinct, and elytra usually a little more abruptly narrowed from apical third to apices. Male genital apparatus with tips of side pieces a little more swollen than in *T. b. blondeli*. Holotype male 15 mm. long, maximum width 5 mm.; allotype female 14.5 mm. long, maximum width 5 mm.

Holotype, male, from CYPRESS RIDGE, MARIN CO., CALIFORNIA, IV-4-51 (J. Helfer collector); chopped from living Sargent cypress [*Cupressus sargentii* Jepson].

Allotype, female, Cypress Ridge, Marin Co., California, V-30-50 (Anderson collector).

Paratypes, 7 males from the type locality (which is sometimes known as Carson Ridge); 5 bear the same data as the holotype, 1 is labeled X-15-15, H. C. Muzzall collector, dead in Sargent cypress, and 1 loaned by F. T. Scott is labeled "Marin County, July, 1933, Collected from cypress log, Cal. Dept. Agr. No. 33621"; also 5 females, 3 from Mill Valley, Marin Co., Calif., VI-18-50, VII-14-50, and VIII-27-50, Jon Schorer collector, on trunks and foliage of Monterey cypress (*Cupressus macrocarpa* Hartw.) in the town of Mill Valley; 1 labeled Cypress Ridge (nr. Woodacre), VI-12-21, F. E. Blaisdell collector, one labeled San Geronimo, California, XI-12-21, J. White collector; and one fragmentary specimen bearing the same data as the holotype except that it was chopped from dead Sargent cypress. There is, in addition, one specimen, loaned by Dr. W. F. Barr, labeled San Rafael, Marin Co., Cal., VII-17-33, and one labeled Cypress Ridge, Marin Co., VI-2-51, A. & J. G. Edwards collectors, loaned by Dr. J. G. Edwards. There are also six specimens collected from Sargent cypress near Camp Meeker, Sonoma County, Calif., II-7-52, J. Helfer collector, of which three were collected alive from their pupal cells in the wood, the other three being dead and more or less damaged. There are also six specimens labeled Mendocino, Calif., (Mendocino County) VII-24-52, J. Helfer collector, chopped from pygmy cypress *Cupressus pygmaea*, of

which two are perfect, the other four being more or less damaged or incomplete.

Five or six additional specimens of this same new form were collected by W. Russell and D. Giuliani, at the type locality. These specimens were seen by Dr. Van Dyke and he assured me that they were all typical of this new subspecies, having the characteristic cupreous markings.

In the past this form has been confused sometimes with *T. opulenta* Fall, sometimes with *T. blondeli* s.str., but it is clearly related to the latter as shown by the condition of the scutellum, strong angulation of pronotal crests, character of elytral markings, general form, punctuation, larval characters, and male genitalia. *T. b. blondeli* ranges from British Columbia into Oregon and possibly into northern California, the larvae mine the wood of giant arborvitae or red cedar (*Thuja plicata*). This new form, *T. b. cupreomarginata*, occurs in a few isolated cypress groves not far inland along the coast of California from Marin county northward. In the Mill Valley area it has moved into planted Monterey cypress (*Cupressus macrocarpa*) and the San Rafael record may indicate its occurrence in planted cypress as no native cypress occur there, as far as I know.

LARVAE. The larvae of the new subspecies differ from those of *T. b. blondeli* in that the anterior margin of the labrum is emarginate at the middle and also distinctly narrowly indented near each side, the pubescence is brown, the anterior margin of the ligula is broadly feebly arcuate, the labial palpi are obsolescent; in the larvae of *T. b. blondeli* the anterior margin of the labrum is broadly shallowly emarginate without the indentations at the sides, the pubescence is yellowish-white, the anterior margin of the ligula is feebly emarginate, and the labial palpi are reduced.

Observations in the field show that this form mines the heartwood of living cypress trees ranging in size from three and a half feet high and with trunks only two inches in diameter to the largest trees available. Trees so attacked appear thrifty and show no ill effects. Trees which are a little deformed or scarred in some manner appear to be more often attacked than perfectly normal appearing trees, and some trees which proved to be infested had portions of their trunks of a distinctly darker color. A cerambycid, *Atimia dorsalis* Le Conte, attacks the Sargent cypress trees and, on Cypress Ridge, is responsible for a considerable flowing of pitch on the

trunks and larger limbs. The larval mines of *Trachykele* commonly extend into the main roots of the trees well below the surface of the ground, and also extend as much as two feet into limbs, but pupation and emergence seem always to occur in and from the trunk. Adults have been beaten from the foliage of the Sargent cypress on Cypress Ridge in the summer. Larvae and adults were chopped from Sargent cypress near Camp Meeker in early February, and pupae were found in pygmy cypress near Mendocino on July 24th.

NOTES ON THE GENUS *METROBATES* IN CALIFORNIA WITH DESCRIPTION OF A NEW SUBSPECIES

(Hemiptera: Gerridae)

ROBERT L. USINGER

University of California, Berkeley

The species of *Metrobates* are typical inhabitants of swift-flowing rivers and streams and have long been known from the eastern and southern United States and from Central and South America. The genus was first recorded from California in 1948 (Usinger, La Rivers, Chandler and Wirth, *Biology of Aquatic and Littoral Insects*, Univ. of Calif. Syllabus SS, p. 175) on the basis of a series of specimens collected in Putah Creek beneath the railroad bridge near Davis, Yolo County, October 24, 1942. These specimens were identified as *Metrobates trux* Bueno by H. B. Hungerford and L. D. Anderson, although it was noted that the dark markings of the upper surface were much more extensive than in the typical form described from Colorado and subsequently recorded from Texas, Kansas and Arizona as well as from Oregon and Idaho. Drake and Harris (Ann. Carnegie Museum, 21: 87, 1932) stated that Texas specimens differ from the Oregon and Idaho specimens "in having the basal portion of the second antennal segment yellowish brown."

Since 1942 the dark form of *Metrobates trux* has been found on several occasions in northern and central California by H. P. Chandler. Most of these specimens are apterous, as was the original series from Putah Creek, but recently Mr. Chandler found a high percentage of macropterous forms in a stream at Oroville, Butte County, July 27, 1951.

All specimens from northern California have the second antennal segment uniformly dark and, in the apterous forms, the pale area of the pronotum reduced to a median spot which is narrowed posteriorly, the mesonotum with the median stripe reduced to an elongate spot which tapers anteriorly, the pale spots in the longitudinal black fasciae much reduced, and the sublateral pale stripes greatly reduced and sinuate. The dark markings are also more extensive on the metanotum and abdominal tergites.

The typical pale form was taken by me in the Colorado River at Yuma, Nov. 3, 1951, and by Mr. J. D. Lattin and me in the Colorado River near Parker Dam in March, 1952.

Variation in *Metrobates* has been studied in Florida by Hussey and Herring (Florida Ent., 32: 166–170, 1949) where it was found that *hesperius* populations formed three subspecies and *anomalus* populations two subspecies. The Florida subspecies differed in pilosity of antennae and legs as well as in color, whereas no differences in pilosity have been discovered in California specimens. Nevertheless, California specimens are easily separated into a southern and a northern form. For the dark form from northern California I propose the subspecies name *Metrobates trux infuscatus* Usinger, new subspecies, with the holotype, male, allotype, female, (Calif. Acad. Sci., Ent.) and designated paratypes from the apterous series collected in PUTAH CREEK near DAVIS, CALIFORNIA, October 24, 1942, R. L. Usinger.

BOOK NOTICE

GENERA INSECTORUM—The following two parts on Coleoptera have been published during the first half of 1953. The plates in both are in black and white, printed by a photographic process; the publishers state that lithography in color has become too expensive.

Fascicule 192. Carabidae Subfamily Carabinae. By G. Vacher de Lapouge. Plates 2 to 10, to accompany the Marquis Lapouge's monograph of the Carabinae. These are plates of the adult beetles; plate 1 (larvae) was published in the first (1929) of the previous four parts.

Fascicule 210. Endomychidae. By H. F. Strohecker. Pp. 1–140, 64 text figs. (many compound), 5 pls. There is a key to subfamilies, and keys to genera within the various subfamilies, for the world fauna. Genotypes are cited; the few described fossils are catalogued. Two new genera and one new species are described, and five new generic names proposed.—H.B.L.

BOOK NOTICES

LONGICORN BEETLES OF CHINA. By J. LINSLEY GRESSITT. *Longicornia* (Paris) 2:1-667, 22 pls., 1 map. December, 1951. Price 4800 francs (priced at \$14.50 in J. D. Sherman's 66th catalogue).

This book-sized issue, volume 2 of the new French journal *Longicornia*, provides a means for the identification of all the species of *Cerambycidae* known from China and Korea, and includes keys to the various categories from subfamilies down. New locality records are given, as well as documented records from the literature; the sources of distributional and host records are correlated by a system of superscript numerals. In all, 1895 species and subspecies in 392 genera are treated. The location of the type specimen is usually indicated, and the type species of each genus is cited. About 350 host plants are listed. One hundred and three species, 11 subspecies, eight genera, and one subgenus are described as new; two tribal names are emended, and new names are proposed for two genera, two species, and one subspecies.

Appendix I (pp. 622-623) treats two species omitted from the earlier text. Appendix II (pp. 623-624) lists species questionably or erroneously recorded from China. Appendix III (pp. 624-630) describes "additional new forms." Appendix IV (pp. 630-631) comprises a summary, and a page of statistics by areas. Appendix V (pp. 632-634) is chiefly a list of names published by Breuning in 1947, and unknown to Gressitt until his own manuscript was partly through the press (in fact the manuscript was written under difficulties, much of it after the Communists were in control of Canton, and was mailed in small lots from Hong Kong). There is an index of host plants, and one of taxonomic names. The 32 plates illustrate 166 species, including nearly all the new ones and some Gressitt species not previously figured.—H. B. LEECH.

PLANT DISEASES IN ORCHARD, NURSERY AND GARDEN CROPS.

By E. Gram and A. Weber; translated from the Danish by E. Ramsden, edited and adapted by R. Dennis. Quarto. 618 pp., 350 text figs., 10 pls. in color. Philosophical Library, Inc., 15 E. 40th St., New York 16, N. Y. 1953. Price \$18.50.

This is a translation of the second Danish edition (1944), with additions and changes in both text and figures to better suit conditions met in England. The main divisions of the text are: I. The nature of plant diseases (pp. 13-98). II. Diseases of tree and bush fruit (pp. 99-228). III. Diseases of vegetables and herbaceous fruit (pp. 229-404). IV. Diseases of ornamental plants and trees (pp. 405-569). V. Control measures (pp. 571-603). Within parts II, III and IV the arrangement of plants or crops is alphabetical; each major part ends with a bibliography. For the more important crops and plants (such as apple, lettuce, pea, potato, chrysanthemum, etc.), there are useful quick identification tables (indented keys) to the symptoms of the diseases attacking them. References to insects are fewer than might be expected. The book is printed on good stock, in large clear type; it is well illustrated, and the text is arranged for ease of use.—H.B.L.